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I—*A Sketch of the History of the Ramoossies residing in the Sattarah Territory and in the Poona and Ahmednuggur districts—By Captain Alexander Mackintosh of the 27th Regt. M. N. I. Commanding Ahmednuggur Local Corps.*

CHAPTER I.

Introductory observations.—The origin and migration of tribes.—That of the Ramoossies involved in obscurity.—The limits of the country over which they are dispersed.—The origin of the tribe and that of their name variously explained.—The tribe divided into two main branches or clans.—Two minor families have sprung up since they crossed the Neera.—The number of the tribe.—The remnants of their language .—Their employment as Rukwalldars or village guardians.—The nature of the duties they have to perform.—The lands and emoluments they enjoy.

We are frequently induced, either by motives of interest or curiosity, to inquire into the character and language, the manners and customs of the inhabitants of a new, or foreign country, whose history is imperfectly known to us, although the result of our researches may prove neither entertaining nor satisfactory. The nature of the appointment I have held for many years past, having necessarily brought me frequently in contact, I might say, in hostile collision, with that portion of the population of the Dekhan commonly distinguished as the predatory tribes, viz. the Bheels, Kolies, and the Ramoossies, and having been recently occupied in suppressing a disturbance in the country around Poona, caused by the latter tribe, I am induced to attempt to give an account of them, in the hope that it may not be unacceptable to those who take an interest in such matters.

It is generally remarked, that the history of the origin and migrations of almost every tribe and nation, is more or less involved in

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obscurity and contradiction, and this is the case with that of the Ramoossies.

The race of people known by the name of Ramoossies, reside chiefly in the outskirts of the towns and villages, in the vallies of the Maun, Neera, Bheema, and Pera rivers, and in the adjoining plains and highlands—within the dominions of His Highness the Rajah of Satara, and the Poona and Ahmednuggur collectorates.

The tract of country over which they are dispersed, is nearly two hundred miles in length; and throughout the Satara territory, and the southern portion of the Poona district, it varies from eighty to about one hundred and twenty miles in breadth—becoming much narrower as we approach the northern limits in the vicinity of Nassik, on the banks of the Godavery—so that the part of the country in which they reside, lies within the 17° and 20° of N. latitude, and 73° 40′ and 75 40′ E. longitude.

It may be observed, that although in several of the Poorans, (the Pudma, Bhruma, Wywurt, Skund, &c.) and the Bhruhud and Lughoo Jatveeweks, a slight genealogical notice is taken of the mixed tribes of Hindoos, the term Ramoossy is not mentioned in either of them. Bharoor is the Sanscrit word applied to the Ramoossies in the Jatveewek, a work principally compiled from extracts from the Poorans.

A short extract from each of the before mentioned Poorans, which are supposed to allude to the origin of these people, might be given here, but as different learned Brahmins, well versed in the shastres, agreed that the account in the Jatveewek is the true one, I shall only insert it.

" The children of a Shoodur (4th class) father, and a Brahminy mother, are designated chandall, (the lowest of the low,) and those of a chandall father and a Eckshuttry (2d class) mother, are termed Dombh: again, the offspring of a Shoodur father and Vyse (3d class) mother, is termed Neeshaad—then the children of a Neeshaad father and a Shoodur mother are known by the name of Poolkussy; and lastly, the children of a Dombh father and Poolkussy mother are called Bharroor, whose profession it is to guard villages, and to warn the inhabitants of any approaching danger."

It is conjectured that the Ramoossies, from having originally lived at a distance from villages, must have been termed Raan-vussy, the resident of waste, or desolate lands, from raan, a waste, a desert, a wood, and vussy, residing; and the harsh appellative of Raan-vussy, was converted, in the course of time, into the more

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euphonical one of Ramoossy. Again some of them maintain, that the name of Ramoossy is derived from Ramvounssy the descendants of Rama; that he created them when he was passing through the Dekhan to Lunka, (Ceylon) in search of Seetah.

The Ramoossy ranks very low among the Wurunu Shunkur, or mixed classes, and far beneath the Poolkush, or Dongry Kolcy, but before the Holar, Mhar, Mang Dhour, &c. These last the Ramoossy scrupulously keeps at a respectful distance. There appears to be no record in existence, from which any information respecting the habits and customs of this tribe is to be obtained :—such information as is attempted to be given here concerning them, was gained entirely by long direct personal intercourse with the tribe, and especially with the most intelligent of the aged men. They have considerable reluctance, in communicating an account of their habits and customs to persons they are unacquainted with, although they appear to have nothing very peculiar to them, that is not common to the other predatory tribes. Their backwardness in this respect, may possibly be partly owing to prejudice, and either self-pride or self-interest, originating in their being generally more civilized, and therefore unwilling they should be supposed capable of committing the atrocities for which they are notorious, and partly from the apprehension that they themselves might become too generally known, and consequently attract the attention of the ruling authorities, which might lead to their being placed more closely under the surveillance of the Police, and that, ultimately, the principal although unlawful source from which the majority of them had been in the habit of drawing a subsistence from time immemorial, would be shut up against them.

By some of the inhabitants, the Ramoossies and Berrurs, or Berdurs, are looked upon as one and the same tribe; but it may be presumed, that their considering the two terms synonimous, arises from the great similarity of pursuits and habits that exists between these two classes. Admitting even that they were originally one and the same tribe, they are at present, and have been for ages, a distinct people.

The Berdurs who inhabit the district of Soorapoor, and are spread over the country east and south of Bejapoor, and the banks of the Toomboodra river, hold no intercourse whatever with the Ramoossies who reside in Maundesh, the district east of Satara, nor do the oldest men among the Ramoossies recollect having ever heard, that their fathers considered the Berdurs, and the Ramoossies, as being

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of the same descent or stock, or that they ever formed matrimonial connections with each other; and as far as my information goes, the opinion of the Berdurs themselves corresponds with that of the Ramoossies on this point.

The tribe of Ramoossies appears to be divided into two main branches, or families, the one being denominated the Chowan, and the other the Jadoo. From these two intermarrying, numerous families have sprung up, but all of them are reckoned to belong to, and to be the offspring of, the two main branches respectively, although they have adopted various other surnames. They are equally scrupulous and tenacious, in adhering to the prescriptive rules of their tribe in this respect, as the higher and more pure orders, never to marry a person of the same kool, or gottur, (family,) as themselves, consequently, the different families of the Chowan stock, considering themselves the descendants of the same parents according to Hindoo usage, never form matrimonial connections with each other; and the same rule stands good with regard to the Jadoo, and the families constituting that branch.

Enumerating their different surnames, I find there are now about one hundred and twenty-five; but as these surnames were adopted, evidently from assuming the name of the village they were born in after they had quitted it, to reside in some other, the original surname was abandoned, and the new cognomen became familiar, and the only one used—or some other name was applied, suggested by some peculiarity in the appearance of a man, such as Assgurry, the large man; Neekary, the man without a beard; and again Shelky, from a man having turned a goatherd.

The following are the surnames of a few of the families of both branches. First: The Chowan; from whom has sprung the Bhanddollkur, Goregul, Shellky, the Keersagur, Assgurry, Koolooch Kurrally Goorkool, Waghmary and Sulkkry, &c. &c. Secondly: The Jadoo, with its descendants the Khomney, Mundly, Goury alias Makur, Yellmur, Jhuppurdy, Langgu, Sheretore, Bhorrdah, Tuttlay, &c.&c.

Since the Ramoossies, however, have crossed to the north bank of the Neera river, two minor and distinct families have sprung up among them. The first is the Rorray Ramoossies of Sonouray, near the Devy Ghaut; and the other, the Goorgool.

The Rorray is said to be an adopted son of the Bhandolkurs, and he, consequently, forms no marriage connection with the Bhandollkur, the Shellky and Koolooch of the Chowan family stock;

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but he intermarries with the Chowan and the remaining families of this stock; as well as with the Jadoo, and all the families of that branch.

The Goorgool is an adopted son of the Chowans. He therefore does not intermarry into the Chowan family, but he does into all the other families of this branch—and into the Jadoo, and all the families of that stock.

The Goorgool might have been an infant of some one of the four principal classes of Hindoos, and reared in the Chowan's house, and subsequently admitted into the Ramoossy caste; and, very probably, the Rorray family originated in the same manner—or he might have been the offspring of a Bhandollkur, and a Shelky by illicit intercourse, but admitted into the caste after the parents had performed the required penance.

The Chowan is considered the most eminent and pure of the Ramoossies; therefore, on all occasions of ceremony and the adjustment of affairs of importance, connected with their caste, the Chowan Naik obtains the precedence, and the presence of one of them is always deemed necessary on such occasions.

From register rolls prepared for me by the native local authorities of all the districts in the Satara territory, and in the Poona and Ahmednuggur collectorates—and, from information communicated by members of the tribe, tables have been drawn up to show the number of Ramoossies, both hereditary and temporary residents (Oopries) of villages, above the age of sixteen years, with an account of the lands they enjoy in Enam, (or freehold,) as well as the amount of their pay and the other perquisites they receive; from this return, it appears there are 3,011 men in the Satara territory, 1,949 in the Poona, and 573 in the Ahmednuggur collectorates, exclusive of 203 Holgah Ramoossies along the banks of the Seena river. Two or three Enam, or foreign villages, may have escaped enumeration, and there are a few Ramoossies settled in His Highness the Nizam's villages, on the western boundary of the Ahmednuggur and Poona districts.

According to tradition, the districts around Kuttow, Musswur, Malloura, Nullgoond, the hill fort of Mymungur, in Maundesh, and east of Satara, also the town of Phultun, are the tracts in which the first traces of the tribe are found, and there can be little doubt, that their permanent location there must have occurred many hundred years' ago.

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They are at present in greater numbers in the Kuttow district, than in any other over which they have spread themselves. There are one hundred and fifty-six villages, and the number of Ramoossies above the age of sixteen years, is one thousand and sixty-three. From Kuttow they subsequently extended westerly into Waidesh, and along the Phultun desh, (the district on the south bank of the Neera,) and, latterly, they crossed the Neera into the Poona district.—Hereafter notice will be taken of their occupying the Poorunder hills,—of their moving across the Bheema, and of their advance towards the Godavery, as far as Sinnure and Nassik, in the collectorship of Ahmednuggur.

In the small district of Pabull, north of Poona, there are fifty-one Government villages, and the population of them amounts to about 33,950 souls ; there being males grown up, 10,747, boys 7,474, women 11,547, and girls 4,182. Now, the Ramoossies in the district residing in these fifty-one villages, including men, women, and children, only amount to 340, of these 108 are males above sixteen years of age ; and 69 boys, and the remainder 163 are women and girls.

By the aggregate of these returns we find that there are 5,636 Ramoossy males above sixteen years of age—we might add about two hundred more grown up men to this number, as residing in the Nizam's or other foreign villages within our own boundary, that may have escaped enumeration—Now by the return from Pabull, we find, that the proportion of women and children of both sexes to the grown up males, is very little more than three to one, and, calculating on this principle, we might reckon that the whole population of the Ramoossies did not much exceed 18,000 souls.

It is very probable that this tribe originally migrated from some part of the ancient kingdom of Telingana, probable east or south east of the present town of Hydrabad ; because, in the scanty remains they have of a distinct language, many of the words evidently belong to the Teloogoo, and it might have been a dialect of that tongue. While their funeral rites and ceremonies of purification bear a great analogy to those of the Linggaiuts, of whom the Jungums are priests, and in the part of the country in which the Ramoossies at present reside, few of the Linggaiut persuasion are to be found. These are more to the east and south east.

A considerable diversity of customs and languages would, in the course of ages, be naturally introduced among them ; and, in fact, the amalgamation of the Ramoossies with the inhabitants of the

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Mharata country has been such, that their original language has been nearly lost,—few of them being able to express themselves in it, and then only in short sentences. It is seldom used by them except when busily employed in plundering, or when they wish to communicate something secretly in the presence of other persons. They will then endeavour to express themselves as well as they can in their own language,—otherwise, they merely introduce a few necessary words in their conversation in Mharata, so as to prevent those present from discovering what they are talking about.

They appear to have been very cautious in preventing their language from becoming known to any other persons than those of their tribe; for, all that the inhabitants know, is, that the Ramoossies have a language peculiar to themselves, and with which the other members of the community are unacquainted.

They have often addressed themselves to me in this language, when they were anxious that I should interrogate any person present on any particular subject; but more especially when they wished to obtain a favour for themselves; or when they were interested about any of their friends that were involved in difficulties. The following is a specimen of it.

The words to which a cross is affixed are evidently Teloogoo. They frequently use the plural number instead of the singular.

A man, Machull
An old man, Moodor†
A woman, Ardub, Artool† Peteet
A European, Arnall
A Brahmin, Parggiah
Moosullman, Malour
A Dhere, or Mhar, Shydoll
A Mang, Ambooj
A merchant, Bumgger
A Ramoossy, Boyill, Boiggiah
A thief, Mootch†
A robbery, (Durrorrah) Tutch
A house, Gooroos,
Bread, Koormull †
A meal, Taglah
Tobacco, Pogguh †
A hare, Koodull †
A deer, Seekull
A hill, Gooduck †
Goor, (sugar) Bellum *
Gold, Nenne
Day, Phukkut

Silver, Dumkut
Night, Ryne †
Pyse, (copper coin) Moorull
Hot, Ley Seeth
Cold, Bujoty
Fire, Seeth
A gun, Doobuk †
A bow and Arrow, Poorkull
A sword, Kuttool †
A stick, Burggell †
A village, Oorrh†
A town, Pudhuh† Oorrh
A road, Terroo†
Water, Neerlh†
Rain, Wannu†
Milk, Pall†
Horse, Goorrum†
Bullocks, Edooll†
Cow, Avull†
Buffalo, Ennum,
Sheep, Gourell
A dog, Kookoll†
Goat, Mekur†

Fowl Korla†	Hide, Kogur†
Stones, Rattal †	Seen, Kunlah †
Good, Jhatore	Dead, Susslah †
Bad, Yerrwar	Afraid, Erpoo †
Glad, Jhatore, Puddah †	Seize, Puttoo †
Language, Matool †	Wound, Nurklah †
Great Jhatore, Puddah †	Blood, Nehtooro
Small, Sunnud, Sunwar	A corps, Machull Sussla
Run, Ookull †	Quick, Esskur
Run off secretly, Hoorkull †	Slow, Geroola

There can be little doubt but that the Ramoossies in their primitive state, led a roving unsettled life, like many of the nomadic tribes, keeping at some distance from the habitations of the more civilized orders of society, and occasionally, when opportunities offered, plundering travellers; they also attacked at night the houses of the inhabitants of towns and villages near which they halted; as a measure of precaution, with the view of protecting their property from such troublesome and dexterous robbers, the inhabitants of various places deemed it most advisable, to employ some of these people in the capacity of a preventive police; and it may be observed, that it has become frequently necessary in many parts of the country, to continue a system perfectly analogous in modern times.

This led to the institution of the village Ruckwalldar and Jaglahs, (the guardian or watchman,) which, in the course of time, became hereditary. With regard to the pay, fees and emoluments to which a Ramoossy Ruckwalldar, or village watchman, is entitled from long established usage, it is necessary to remark, that one uniform system does not prevail in the mode of remunerating them.

In some towns and villages, also in hill forts, the Rukwalldars, and a few of their followers, enjoyed merely a certain quantity of land rent free, for discharging the duties that were assigned to them. In other villages, they only receive an annual allowance in cash, partly levied by an extra cess, and partly paid from the Government revenue, under the head of village expences; and again, in a few villages they only receive the Balottah allowance.—In the Satara territory, the Ramoossy watchmen receive this huk, or allowance, on the same footing as the four members of the first class, or division, of of the twelve Balottahdars; while those to the north of the Neera, in the Poona and Ahmednuggur collectorates, only receive shares of the Balottah allowance, corresponding with what the four members of the second division are entitled to.

The watchmen in a great many villages hold portions of rent free

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land, and have stipulated allowance in cash, besides the Balottah perquisites; while in other places they receive only the cash payment and Balottah.

Ramoossy, in his character of Rukwalldar, or watchman, is not included among the twelve members of the village Bolottah,—this name is in the list of Alottahdars, or those who receive the charitable allowance. The inhabitants of some villages grant the Balottah dues of their own free will and accord, but do not acknowledge it as a perquisite, or right of office, due to the watchman, or which he can claim in addition to the money allowances and the rent-free land which he enjoys.

Besides these emoluments, the Ramoossy receives a perquisite which is termed the Tull cha pysa, or fees for occupying the halting or resting place. Merchants and travellers passing through the country with cattle loaded with goods, and occupying the tull, or berarr, (resting place) in or near a village, with fifty or several hundred bullocks, conveying grain, salt, cloth, &c. it matters not what description of merchandize, the Ramoossy watchman undertakes to protect their property and persons during their stay. In some few towns, the Patells and Mhars get a trifling allowance from these travellers—but the Ramoossy always receives his fee, averaging two, three or four annas for every hundred bullocks—or should the travellers, or, more properly, the merchants be in separate parties, putting up at the same tull, they will pay him two or three annas each. If there are only ten or twenty bullocks, they give five or six pyse, (from one to two annas:) an anna may be about three half-pence.

Should the merchants' cattle have come unloaded, the owners give the Ramoossy a small quantity of flour, or a few cakes of bread, for his trouble. In case a bullock, or part of the property is lost or stolen, the Rukwalldar becomes bound to recover the same, or to make the loss good; a traveller, with a horse, halting at a village, gives a pyse or cake of bread to the Ramoossy, for the protection afforded during the night.*

The Ramoossy watchmen almost invariably receive, or did receive from the villagers, a sheep, or, in lieu thereof, eight annas, at the annual festival of the Dussra; also a kumbly (blanket) and a pair of shoes.

The Rukwalldars hold grants of freehold lands in various places, as a reward of services performed by some of their ancestors, besides,

* The servants of European gentlemen and those connected with them, most commonly resist paying these dues.

holding at times Mookassy rights in different villages; * and again we find instances of their having had lands conferred on them in freehold gifts, as the price of blood—when a Rukwalldar might have died accidentally from a blow, or ill treatment inflicted by the retainers of a Jageerdar, or Government agent,—he petitioned the Peshwah for a pardon for himself, and entreated that a certain extent of land might be bestowed on the family of the deceased for their support, The Sassoor Ramoossies enjoy sixty begahs of land granted in this manner, in consequence of one Cheembajee having died of ill treatment received at the hands of the Jageerdar Mendly of Sassoor, about eighty years ago. In the table annexed may be seen an account of the lands, &c. &c. granted by Government and the villagers to the Ramoossies. Since this statement has been prepared, Government has sanctioned, with a view of rendering the police of villages more efficient, lands to the value of about nine thousand rupees yearly rent, to be granted to the Rukwalldars of villages in the Poona collectorate.

In such villages as the Ramoossies hold freehold lands, we find the ground occasionally cultivated by themselves; however, this is seldom the case; they at times get a koonby to assist them in the labours of the field, and make a division of the produce according to the number of bullocks employed, and other aid contributed by each; but the general, and almost invariable custom is, for the Ramoossy to engage with some of the koonbies to cultivate the land, and the koonby to hand over half the produce of the field to him, after deducting the expense of seed, reaping, thrashing, and other incidental charges. However, the land held by the Ramoossies is frequently of a very unproductive quality, and consequently for years, is entirely neglected.

In some few villages in each pergunnah there are one or two Ramoossies to be found, of peaceable and industrious habits, and who pursue an agricultural life, cultivating the village lands, and paying rent as the other cultivators do, the females of their families labouring

* The Mookassy was an allowance granted on account of military services in general, and varying from eight to ten, and from sixteen to twenty-five per cent. on the revenue of a village. The Ramoossy Naiks of Poorunder enjoy the Mookassy of the small village of Sakoordy since the first grant made to their ancestors by the Rajah of Satara for their services in a military capacity. Again we find the Bhetara Mookassdar of the small village of Bhewndy, near Poorunder, receives twenty-four (24) per cent. of the revenue of that village. It was originally granted as a reward to one of the family who took charge of Parwutty Baie, the widow of the Bhow, after the dismal defeat of Paniput, and conveyed her in safety from the battle field and cruel pursuit of the victors, to her brother-in-law the Peshwah.

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in the fields along with them; yet it happens occasionally that this is found a difficult, and, in present times, a most unproductive line of life, so that some one of the family is driven to his shifts, to add his mite to the general purse from which the Government dues are to be paid, and to the Ramoossy, one of the most natural and most ready modes of obtaining this, is by helping himself by stealth to some part of his neighbour's property.

The offspring of a Ramoossy by a koonbin (a woman of the Koonby caste) conforms more readily to the settled life of a cultivator—even a few of the most unsettled of the others, who have accumulated a considerable stock of money by successful depredations, take to cultivating a few begahs of ground for several years successively.

However, the above observations apply more especially to the Ramoossies in the southern districts of the Ahmednuggur collectorate, and to all of those in that of Poona, as well as in the northern district of the Satara territory; and it may be added that they seem a people that would much rather prefer living by their wits, scheming plans of dispoiling others, than by labour which they heartily and radically hate, at least, labour such as the hard-working and industrious koonby (farmer) is obliged to submit to.

In every three, five, fifteen, and sometimes twenty villages, there is a head Rukwalldar, or Naik, in general denominated the Sir Naik, (or chief;) he resides in the principal town or village of which he enjoys the watchman's allowances and perquisites. He keeps as many of his relations and retainers with him, as he may consider necessary for the discharge of the duties of his office, while he employs one or more relations and followers to reside, either temporarily or permanently, in the other villages of which he has the guardianship. These receive the Balottah allowance, &c.; "and the Chief Naik," beyond receiving yearly at the Dussra festival, a pair of shoes, a sheep, and a small quantity of grain, or living at the expense of the village, when he proceeded on a tour of duty, derived no allowance from the distant villages. However, he enjoyed the influence arising from having the patronage of filling up casualties among the watchmen in case of death, removal, imprisonment, or desertion. The inhabitants of a village seldom or never nominate a Rukwalldar of their own choice, without having communicated with the head Naik, in the first instance; for should he be averse to their nomination, the people know very well, that it would benefit them little or nothing to retain a man selected by themselves.

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The Rukwalldars are termed the wuttundars, or hereditary watchmen of the different villages, while Ramoossies coming to reside there, are termed oopries, or temporary residents; and, admitting that the latter have resided in the place for several generations, they are never permitted to enjoy the perquisites or privileges of the wuttundars, unless during their stay in the villages the Rukwulldarship have become vacant, and the oopery has been regularly appointed to the situation.

The succession to a vacant Rukwalldarship, has frequently led to much contention, and many oppressive acts; and it occasionally happened, that when the Naik was an infant, a very old man, or one of an imbecile understanding, some one of the relatives, an energetic and ambitious character, usurped all the authority, retaining it in his own hands.

The influence he thus gained, enabled him to exercise considerable sway over those of his own tribe in the neighbourhood, turning their services to his own private account, by encouraging them to commit depredations, in which he occasionally joined, or probably led them on; or by receiving a share of the plunder, which they offered for the purpose of ensuring his good will.

The measures that were usually adopted under the Peshwah's Government, on the occasion of a robbery taking place, have undergone some modification under that of the British; but the present account is an attempt to explain how these matters were conducted in times gone by. When a robbery occurred in a village, the Ramoossy Rukwalldar was immediately sent for, and informed of the circumstance; and whether a door had been broken open, or a wall scaled or undermined, the watchman became responsible to the owner for the value of the stolen property that had been carried off, unless the act had been perpetrated by a Durrorrah, or a considerable body of armed men. But the will of the agents of the ruling authorities was so arbitrary and uncertain, that the Ramoossies dared not relax in the slightest degree their exertions to discover the plunderers, under any circumstances.

Should the watchman have failed in seizing the robber, or robbers, he in general engaged to make good the loss in the course of fifteen days, or a month, if the articles taken away did not amount to any great value; but should it have been discovered, that a number of persons were engaged in the affair, the Rukwulldar prepared to proceed in pursuit of the plunderers, early in the morning, trac-

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ing them by their footmarks; and for this purpose, he was joined by the Patell, the Karbary Koolkurny, the Chougla, and some other wuttundars of the village. The watchman, taking a twig of the branch of a tree, cut it to the size of one of the foot-marks for a measure, and should the gang appear to have been numerous several measures were used. The Ramoossy now took the lead, accompanied by the villagers, following the track, and if the watchman and his followers could trace it, (which they are singularly expert in doing,) in a satisfactory manner, into the boundary of the adjoining village, the inhabitants of that village were obliged to repair to the boundary. These persons, for their own satisfaction, traced back the foot-marks of the robbers for a short distance into the adjoining fields; and when they returned to the boundary, the different measures that had been used for measuring the foot-marks, were carefully and formally handed over to them, (as they were obliged to prosecute the search immediately;) and in this manner it was followed up from village to village: a Ramoossy and a Mhar from the first village continued with the parties, until the robbers or the property were discovered, or all hopes of success had been abandoned.

Should the gang in crossing a river have gone any distance along the water, to prevent their being traced, or kept along rocky or stony ground for the same purpose; or should the traces of their footmarks have been lost from travelling along a road frequented by sheep, or cattle, still the inhabitants of the village within the boundaries of which this took place, were held responsible to the owners for the value of the property.

In the event of a difference of opinion arising between the inhabitants of two contiguous villages respecting the track of the robbers, the Patells, Chougla, and Ramoossies of two or three of the adjacent and disinterested villages, were chosen to arbitrate the matter in dispute, when it not unfrequently happened that it was finally arranged, that both villages should contribute an equal share to reimburse the owners of the lost property.

Again, at times when foot-marks of a gang had been clearly traced within the boundary of a village, the Rukwalldar, if he had been concerned in any way with the robbers, would deny the truth of the circumstance in the most determined manner—and solemnly declare that the foot-marks pointed out must have been old, or those of some other persons. In fact, he was well aware of the necessity of exerting his influence and ingenuity to evade the consequence of the re-

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sponsibility that was thrown upon him. Coercive measures, however, were sometimes had recourse to, to force him to his duty, by either recovering the stolen articles, seizing the robbers, or pointing them out to the village authorities; and, until either of these objects had been effected, security was taken from him for the fulfilment of his engagement, or the Naik himself was placed in confinement.

Should the Rukwalldar, however, have been really innocent, and ignorant of the outrage that had been committed, until the persons following the track had reached within the limits of his charge, he would after some little search within his own boundary, return to his house, if he failed in discovering the direction the gang had proceeded in, having previously ascertained, most minutely, from the persons that had come from the village where the robbery had been committed, the day of the week, the hour of the night or day on which it occurred, with a particular description of the different articles that had been carried off, and if the gang had been seen any where when retiring from the village with their spoil: if so, at what place, and at what hour. On all these points they endeavoured to collect the most correct information, to enable them, if possible, to determine at what hour of the night the gang might have entered the boundary of the village on their return with their plunder. Then, if according to their calculations, they had arrived after midnight, or towards morning, they concluded that the robbers could not be at any great distance, and that they must have belonged to some of the neighbouring villages;—or should they have been strangers, that they must be concealed some where in the vicinity. Two or three persons probably women or boys (Ramoossies,) were sent to search the adjacent ravines, or jungles, or wherever there were any lurking places, pretending that they were picking up cow dung, or branches of bushes for firewood,—while some of the Ramoossies proceeded to some of the adjoining villages, and without any allusion to the robbery entered into conversation with the men and women, and endeavoured to discover if the Ramoossies of the village were all at home on the night on which the robbery occurred, after a good deal of questioning and cross questioning, if it appeared they were all present, the Ramoossy, satisfied with what he heard, proceeded to another village. But should he have been told, for instance, that Bappoo had gone to Looney to visit his sister, and that Ballah had gone to the Pattell's field at Wurgawn, to steal some grain; the Ramoossy made inquiries at Bappoo's sister's house at Looney, if the brother had been there on the night in ques-

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tion, and should this prove to have been the case, he was satisfied. He next made inquiries at Wurgawn, about the Patell's fields having been plundered on a particular night; after having sifted this question well, and learned that no grain had been missed from the Patell's field, the Ramoossy returned to make some further inquiries about Ballah, and seizing him, he charged him with having been engaged in the robbery; for most probably the Ramoossy during his peregrinations received some hints of a suspicious nature respecting this Ballah. In some such manner, or in one very similar to it, a clue frequently was found which led to the detection of the party that were concerned in the robbery, and the recovery, of the plundered property.

In the event of the Ramoossies having thus succeeded in apprehending the robbers, the Rukwalldar was released from the responsibility for which he had given security. Should he, however, after his utmost exertions, have completely failed in laying hold of any of the gang, the Rukwalldar most commonly presented himself before the Patell, and prayed of him to stretch out his powerful and bountiful hand to aid in extricating him from the difficulty in which he was plunged, arrangements were then proposed for adjusting the matter;—and if the inhabitants and the Ramoossies of the village were very poor, (which was but too commonly the case,) the owner of the lost property was, probably owing to the poverty of the people and the hard circumstances of the case, obliged to compound for half, and even much less, of the amount of his loss. To make good the required contribution, the Patell, Karbary, Kookurny, the Wuttundars (hereditary farmers,) and the Ramoossies, paid certain proportions, and in the event of the Government authorities being obliged to interfere, they endeavoured to collect the money with as much consideration as possible for the state of the people. Settling such affairs often caused much annoyance, trouble, and distress, to all those who thus became indirectly connected with the original business.

It is known that the Patells sometimes made the watchman contribute the largest share of the sum they were called upon to subscribe. The character and arts of the Ramoossy Naik being familiar to the Patell, he was threatened, and rather than run the risk of having any of his rogueries brought to light which might involve him in further trouble, he agreed to the Patell's propositions. *

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* Government are anxious to guard as much as possible against oppressive

The duties of the village Rukwalldar or Watchman, although they are unceasing, are comparatively of a light nature; and his success depends on his personal character, his activity, and his local knowledge; on his attachment to the village, and his desire of keeping on the best footing with all the inhabitants, and guarding their property from the depredations of others,—and above all, on not conniving at the spoliation of any part of it whether within doors or in the fields, by any of his own family, or followers;—unfortunately, many are the causes of complaint which the villagers, but more especially the farmers, have against the watchmen on this account.

These faithless warders not unfrequently carry off during the night, part of the corn that had been cut down and left in the fields, and steal the grain from their Khullies, or Rasses (temporary farm-yards,) in the fields, or near their villages;—Yet rather than be at open war with the Rukwalldars, these complaints are seldom, or never, pressed upon the notice of the Government agents.

There are instances of the Ramoossy Naiks who are of a bold and daring spirit, having a great ascendency over the village Patells and Koolkurnies, but which the latter, do not like to acknowledge openly. These dread representing to higher authority the irregularities which the Rukwalldar and his followers are guilty of;—and it sometimes happens that the village officers participate in the profits which the Ramoossies derive from committing such irregularities.

A great number of the Ramoossies and their families live in extreme poverty and wretchedness, dragging on a very miserable existence; many of those in the most distressed circumstances are usually persons, who had come from distant villages, or quitted their native place, in consequence of having been concerned in some theft, or robbery, when most probably, several persons had been badly wounded, or killed; and some of them keep moving about the country in expectation of obtaining some employment.—These Ramoossies when they become inmates of a new village, support

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acts in levying fines, and to conform, at the same time, with long est[illegible] usages of the people. I subjoin an extract from the regulations of the Bombay Government, to show how the Magistrates are to act in such cases Reg: XI, of XXX. "When a robbery has been committed within the boundary of a village, or the perpetrators of a robbery have been satisfactorily traced thereto, and neglect or connivance be charged against the inhabitants or the police establishment with regard to prevention, detection, or apprehension, it shall be competent for the Magistrate to investigate the matter as a criminal offence, and if the fact be well substantiated to exact a fine not exceeding the value of the property lost, the whole or part of which may be awarded in compensation to the owner, according as the degree of caution and activity which he evinced on the occasion may deserve, and the Court of Circuit is directed to inquire into such matters."

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their families by selling grass and firewood which they cut in the adjoining hills and jungles, unless they should have succeeded in securing some articles of value, in the commission of the robbery that may have caused their flight from their homes. Should this have been the case, they probably, at the termination of a few months, purchase a couple of bullocks, and take to farming as long as it may suit their purpose.

These new comers, are the persons who are generally guilty of petty robberies in the vicinity of the villages they reside in. They waylay solitary travellers approaching to, or departing from them, in any jungle, or strong ground, a few miles from the place. They rush unexpectedly on the traveller with their faces muffed up, to prevent their being afterwards recognised. They force him to surrender to them any wearing apparel of value which he may have on his person, and whatever other property worth taking he may have in his possession. They then return to the village rapidly, by a circuitous route,—and reach their homes long before any account of the robbery has transpired.

It may be mentioned, that the Rukwalldars give encouragement to such persons, but warn them against molesting the inhabitants of their own villages, and plundering any travellers, except strangers, and persons, from a distance. When two, or three of these start to commit a robbery on a few travellers halting in, or near the village, they have been known to reverse their shoes, on some occasions, when returning with their plunder.

It is but justice to remark, that the Rukwalldars of some few places, have established a character of zeal and activity in the discharge of their duty,—and that in their villages a robbery has not been heard of for years. These effectually prevent the intrusion of any persons for the purpose of plundering; and, should any robbers be bold enough to assail the house of any person in their village, and carry off any property, the Rukwalldar Naik himself will go the whole way upon the track, passing through the boundary of the various villages the robbers may have passed in their route, one or two persons of those villages merely accompanying him; for, being enraged and indignant at the insult offered to him, he is induced to take all this trouble himself, in the hope of being more completely revenged on those who dared to bring disgrace upon him.

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CHAPTER II.

The secrecy and rapidity with which they commit Durrorrahs or gang robberies.—Other castes guilty of similar outrages.—The different terms used by them explained.—The measures pursued by them to obtain information and to ensure success to their plans.—The oaths they take.—How they dispose of the captured property and the value it is generally estimated at.—The village gold smith and petty Marwary merchants, afford facilities for disposing of stolen property.

The resolution, secrecy, and rapidity with which the Ramoossies concert their schemes, and carry them into execution, are rather remarkable; for there are at times a few Mhars, and Mangs, likewise men of the Koonby tribe, associated with them on their plundering expeditions. Yet before much time has elapsed from the commission of the outrage they may have perpetrated, it is pretty well known who were the principal actors in the affair;—still however, information is withheld, chiefly from the dread of the delinquents embracing some violent, or malicious measures against such persons as may have become acquainted with their proceedings, and are likely to make known the circumstances to the proper authorities. For such persons as are capable of communicating information have little inducement to do so,—not wishing to incur any risk of danger, or the inveterate ill will of the robbers, by engaging in matters that do not immediately concern themselves;—moreover, it frequently happens, that instead of gaining any advantage by becoming informers, they would most likely be put to considerable expense, at all events, to very great inconvenience by being obliged to attend as evidences at a distant Court of Justice, where they might be detained for an uncertain length of time;—they weigh well all these matters, and consider it best to be silent on the subject, and the robbery in the mean time is partly forgotten, till probably some of the robbers have had a quarrel among themselves about the division of the property, or one of them, from a grudge, or spirit of malice and revenge, has communicated the long wished for information.

The method in which they set about gaining intelligence, and carrying their plans into execution, and finally disposing of the property of various descriptions that fall into their hands on these occasions, I shall now relate, as far as I am acquainted with it, explaining in the first place, the meaning of the term Durrorrah, which it will be necessary to employ very frequently in the sequel. It may be noticed here, that besides the Bheels, Kolies, and Ramoossies, the caste of Mangs are in the habit of committing Durrorrahs.

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The Mangs in the north west and the southern boundary of the Ahmednuggur Collectorate, and those around Sholapoor, and in the eastern quarters of the Poona district, are very desperate robbers and not unfrequently commit murder, or inflict the most severe wounds on persons that offer resistance to them while plundering, and sometimes for the purpose of striking terror into the people in the nighbourhood of the house they are going to plunder, they will without the least hesitation cut down any persons they may encounter in the road. The Mangs along the country between Satara and Kolapoor are likewise a very bold and cruel set of robbers : Kykaries commit robberies also in gangs ; these people will be alluded to in the Sketch of Oomiah's life,—Koonbies (farmers) also try to realise money in this way.—These in general join some of the other castes in such excursions, but there are some noted men near Poona who venture to plunder occasionally in the Mawils* by themselves. The Bunjaras who are a bold and formidable race, when traversing the country with herds of bullocks, transporting grain or salt, sometimes perpetrate robberies in gangs—and they are not over scrupulous in committing murder on such occasions, if they meet with opposition or deem it necessary for their future security. The Dheres, alias Mhars, alias Purwarries, although in general a very trust worthy and most useful class of persons, occasionally commit gang robberies—but it is seldom that these people are guilty of such crimes to any great extent, unless they have quarrelled with the Patell and other villagers—they consequently strike work till they obtain redress. During this period, the Balottah perquisites are withheld from them and they are very apt to subsist by foraging on the property of others.

The word Durrorrah is used by the inhabitants of the Dekhan to express a night attack made on a house or tent by a body of armed men for the purpose of plunder. "Daka" is the Hindoostany term and the word used by the Ramoossies, is "Tutch," which conveys the same meaning in their language.

Attacking an escort marching in the day time with money, jewels, &c. for the purpose of capturing the same, they term "Rokurparna" ;—and attacking a body of merchants proceeding along a road with a quantity of cloth or goods of any other discription—also attacking any number of travellers, to plunder them of

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* The vallies between the hills branching eastward from the Syeedry range of mountains so called.

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their wearing apparel, or such valuables as they have in their possession, is called "Waat parna" and "Rahmarna."

The man that heads a Durrorrah, or employs others to commit one, is always a Naik, or person of considerable respect amongst his tribe, in the particular district in which he resides.

Previous to the Ramoossies' attempting to commit a Durrorrah, or attack a treasure party, &c. they always manage to obtain the most correct information regarding the house, or place, they mean to attack,—and the number and description of the persons whom they are likely to encounter in their enterprise,—to enable them to make suitable preparations before they set out on their expedition.

When they are particularly anxious to gain correct intelligence about any bullion, or valuable property, that is to be transmitted from one place to another, and they have no confidential person in the place, or among the immediate attendants of the Banker, or the Merchant, which the Ramoossies sometimes contrive to have; then probably the Naik himself will go in search of intelligence, assuming the appearance of a poor wanny, (shop-keeper,) or of a Brahmin, by putting his clothes on after the fashion of those people,* or a couple of smart Ramoossies will be employed. These go prowling about, and enter into conversation with the people in the neighbourhood, and manage to pick up such information as they may deem necessary without causing suspicion.

For the same object, and to examine minutely any wealthy person's dwelling, they frequently adopt the dress of a Goossyne or Vyraggy,† who wear clothes of a dark orange, or brick dust, colour;—or of a Waggiah ‡ who carry about with them, in small bags made of tiger skin, a quantity of "Bhunder"‖ sacred to their deity, and armed with a small spear, &c. Should these emissaries find that the required information cannot be obtained in one day, and that it will take several days to obtain it, they have recourse to pretended sickness, as an excuse for remaining in the town or village, and very commonly they tie a rag round their foot or ancle with some leaves, affect to be lame, and moving about with apparent difficulty and pain, beg from house to house, and shop to

* Almost all castes are known by the way in which they wear their Turbans and Dhotturs.

† A particular description of devotees.

‡ Devotee beggars followers of Khundobah.

‖ Pounded turmeric—curcuma.

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shop.—When they approach the house which they wish to reconnoitre, they endeavour to excite the sympathy of the inmates especially of the females, calling out, that any thing they may bestow in charity, will be restored to them a hundred fold, and praying that both their families and riches may increase, and that they may never become widows. The sly rogues are all this time, making their observations, and probably trying to form an acquaintance with some of the domestics of the family, or one of the children, in order that, should they afterwards meet either near the temple, or the village well, &c., they may the less suspectedly enter into conversation with them—Having acquired such knowledge as was wanted upon all points, they quit the place, and return with all speed to their homes—or rejoin those who employed them. These spies are sometimes so successful, that they produce to the Naik a list of the property, with the value of each article inserted, whether it is money, or jewels; the date on which it is to be dispatched, the number of the escort, and how armed, with other particulars; should it be the description of a ho use that was required, all that they observe is mentioned—besides that, on a particular night, the owner is to have a few friends at his house, to hear a portion of the shasters read. This is a very material point to be learnt; for if the house be a very strong building, with a large gateway, the wicket is kept open, or indifferently fastened, on occasions like that alluded to, and this gives the Ramoossies an opportunity of rushing into the interior, which very likely they could not accomplish under other circumstances, owing to the strength of the place.

The Naik determines on the number of men, to be employed,—whether ten, twenty, or thirty, or double that number. This will be regulated by the nature of the service on which they are to be engaged, and the number of friends he can reckon on, together with the influence he possesses over them. Should twenty men be considered equal to the enterprise, and the Naik probably able to muster only five or six men in his village, he sends to apprize the necessary number of his friends, that he requires their attendance at his house on a certain night, for some particular service. They accordingly assemble at the appointed time at his house, and after some consultation, they separate. Two, three, or four of the guests (as they are termed) take up their quarters in the houses of each of the Naik's relations, and they remain concealed there all the following day. A supply of bread is prepared for the party, sufficient for one, two, or more days, according to the distance they may have to

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travel; should it have been remarked by one of the villagers to any one of the party that an unusual number of strangers had been observed near the Ramoossies' houses early in the morning, an answer is given, which, had generally been previously settled on among themselves, to remove suspicion from them, viz. that they were solemnizing some particular festival, the death of some one of their relatives, the betrothment of one of their children, or the fulfilment of a vow made during the sickness of one of the family for his, or her recovery, &c. Before they set out in the evening, they take a solemn oath* before the Naik, that they will not disclose to any body whatever, any thing connected with the robbery which they are going to commit, nor mention the name of any of those concerned in it. If the Naik is a man of more than usual influence, he will make them promise in a similar manner, that they will not retain or conceal any part of the property, that may fall into their hands, and that they will faithfully deliver up every particle of it to him, that he may distribute it in the customary manner.

It is an established usage amongst them, to vow that they will make a suitable offering to their god Khundobah, if their expedition should prove successful. Formerly, there were some families who presented an eighth and a tenth of their profits at this deity's shrine; but those days have passed away, and what they offer at present is comparatively a trifle; occasionally from one and two, to three and five, at most ten rupees, and this is expended in purchasing cocoa-

* It may be as well to describe how they take an oath—The Ramoossy swears by the Bel Bhundar—this being considered by them the most binding of obligations (the Bel) (Cratava Religiosae) is a tree that grows to a considerable height. It produces a fruit very similar to the Kuveet or wood apple—only it is of a more spherical form—and when the small ones become dry and hardened, they are sometimes used by the brahmins as snuff boxes—the leaves are very small and oval shaped. The extremities of the branches terminate in the shape of creepers varying in length from one to two and three feet. The tree is sacred to Mhadeva in the same way that the Toolsay shrub (purple basil—Acimum sanctum) is consecrated to Vishnoo a few of the leaves of the Bel, also some grains of Jawary (Holcus saccharatus) are mixed up with the Turmeric powder (Bhunder) which had been previously placed on the Ling, the deity they worship. Then taking a small quantity of it between the fingers of the right hand they repeat the oath they are required to take—qualifying it with imprecations in case of failure. They then cast a little of the powder into their mouths, and rub a quantity of it on their forehead. They seem to be of opinion that oaths were much more respected and considered much more binding on the conscience in former times than at present—indeed, so much is this the case, that the Ramoossies have little confidence in each other, although their faith may have been pledged in the most solemn manner. It is the general remark over all the Dekhan, that falsehood and perjury are much more common in our Courts of Justice now, than eight or ten years' ago—that the proportion exceeds at least fifty per cent—this is stated on native authority.

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nuts and Bhundar, some of which is placed before the deity, and the rest is thrown up among the hungry Gooroohs (attendants of the temple,) and such persons as may be present paying their devotions. The Poorundur Ramoossies make this vow to the goddess Bhoanny, of Kondunpoor, near the fort of Singhur when they proceed to plunder to the westward, either in the vallies of the Syadry range of mountains, or below in the Konkan. The Looney (Kallburs) Ramoossies invoke the god Ramah to favour them on such occasions.

They arm themselves chiefly with swords, taking one, two, or three matchlocks or more, should they judge it necessary; several, also, carry their shields, and a few have merely sticks, which are, in general, shod with small bars of iron from eight to twelve inches in length, strongly secured by means of rings, and somewhat resembling the ancient mace. One of the party carries a small copper or earthen pot, or a cocoanut shell with a supply of ghee, or clarified butter, in it, to moisten their torches with, before they commence their operations.

The Ramoossies endeavour as much as possible to avoid being seen by any body, either when they are proceeding to the object of their attack, or returning afterwards to their homes. They therefore travel during the night time; and before day light in the morning, they conceal themselves in a jungle or ravine near some water, but at a distance from any village, where they are not likely to be observed by any of the inhabitants, they sleep here all day, and move on again in the evening. They proceed in this way to the distance of thirty, fifty, and eighty miles, till they have reached some particular spot in the vicinity of the village where their game is. When they are pursued and much pressed, at times they will throw themselves into a bush or under a prickly pear plant, coiling themselves up most carefully, that the chances are their pursuers will pass them unnoticed.* I have known the Bheels and Kolies do the same; their women are equally expert in secreting themselves in a similar manner. It is rather singular that while these people keep

* The Ramoossy Naik Bhojajee Bhandolkur who was the bosom friend of Oomiah, was seized some years ago near Poorunder, when a party of the Police were escorting him a prisoner (with his arms pinioned behind) to Sassoor, and at the time they were passing through a mangoe grove, Bhojajee broke loose from his escort and ran off with great speed towards the hills, but apprehensive his retreat thence might be cut off, he determined to take refuge in one of the trees a head of him, and by this means mislead his pursuers, as he had gained a little on them, and observing a tree with a branch projecting in a horizontal direction favourable for his purpose, he briskly seized it, swung himself aloft where he contrived to hide himself among the leaves.

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roving through the most unfrequented spots of these hills and jungles where it is well known there are many tigers and bears, few, if any accidents happen, although they are often encountered, particularly at night. The members of a Bund, however, are fully impressed with the superstitious idea that their own good fortune aids them while so engaged besides being especially under the protection of the spirit of the forest, tigers and bears are prevented molesting them.

Should they be following a treasure party, one of their spies here joins them, and informs them that the party, with their charge, will move from a particular village and in their route will pass near them in the course of the morning. Some favourable spot near the road is fixed upon by them to take post in, ere the treasure arrives. The gang having girded up their loins tightly, and twisted a cloth firmly round their faces to prevent their features from being distinguished, when the treasure party comes abreast of them, they rush on the escort and immediately commence seizing the money. If the men in charge attempt to use their arms, the Ramoossies instantly use theirs, and after two or three of the escort are wounded, or, probably killed, the rest move off to a distance leaving their charge in the possession of the gang. Ramoossies carry off their prize as rapidly as possible, into the nearest jungle or hills, and after they make a division of it into small portions, for the convenience of carriage, should it have been in large bags, they march off with all possible speed by a different route to that by which they had previously come, and before reaching their homes, one of the party is deputed with a contribution of one, two, or five rupees to be presented as an offering to their god Khundobah, or the goddess Bhoanny, in fulfilment of their vow. When they have reached the Naik's house, all the money is deposited before him. He distributes the amount equally among all, keeping a sum equal to about twice the amount of a Ramoossy's share for his own portion; however, he sometimes takes much more, but this of course depends on his character and influence. Oomiah, for instance, required those he employed, to deliver up to him the property of every description that fell into their hands, and he afterwards repaid them according to the ideas of the service they had performed. It was seldom he acted very liberally on these occasions, and the consequence was, that, latterly he was defrauded of the greatest part of the property of which the poor people were plundered notwithstanding that he was in the habit

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of making the Ramoossies he employed to commit Durrorrahs, take a most solemn oath that they had not secreted, or withheld, any part of the plunder. An account of the cruel and tyrannical system which this most notorious Ramoossy Naik established when he was at Sakoordy, in the year 1829, and 1830, will be given in detail hereafter.

It is necessary to observe that the Ramoossies make a point of always going in sufficient numbers to enable them with ease to overpower an escort. It is very seldom that the latter, in consequence make any great show of resistance and sometimes none at all, the Ramoossies seizing two or three of them and beating others with sticks, give time to the rest of the gang to throw the treasure from off the tattoos or bullocks, and run away with it.

When a gang of Ramoossies encounter two or three men passing along an unfrequented spot, with treasure, or any valuable property, they will sometimes put them to death, if they make any resistance, or recognise any of the gang, and their bodies are buried in the bed of a nulla or thicket in the vicinity. The travellers proceeding on their journey will probably observe three or four men sitting in the middle of the road some distance in advance of them, apparently engaged eating paan supary, for upon the approach of the travellers, one of the party will pretend that he is busy cracking a nut between two stones, whilst another is tendering tobacco to his companions; two or three of their friends well armed remain concealed behind some bushes or stones, in the vicinity and should the travellers offer resistance when called upon to surrender their property, the party call out in a threatening manner, that they had better deliver it up otherwise they will all attack and kill them.

Should the object of attack be a banker's or merchant's house, or that of any wealthy individual, the Ramoossies prepare themselves, and proceed the same way as they do when they go to plunder treasure, only that they carry one or two small hatchets, and probably a crow-bar with them, in order to break open the door of the house, should they find it fastened.

In case of their being attacked, and compelled to run away, when busily occupied in plundering a house, they almost invariably fix on a convenient place as a rendezvous for them to re-assemble at. This is to admit of their returning to their homes in a collected state; for should they disperse over the country, some of them might be apprehended the following day. Besides, should they not have

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secured any thing of value before they fled from the house, they will, probably, proceed to a neighbouring village, and plunder a house, or shop, there, as an anterior movement to their returning to their homes. I have known a gang of eighteen men visit three villages successively, in this manner, in one night.

When a gang has arrived within six or eight hundred yards of the village in which the house is, they mean to attack, the portion of them allotted to enter the house, take off their shoes, some of these tie their shoes in their waist, but the majority of them deposite them along with their sword scabbards in some bushes or grass nigh at hand, for were they to take their shoes and scabbards with them, some of them might be lost in the bustle that usually takes place in such doings, and afterwards be recognised from the workmanship, as belonging to some particular village, and ultimately lead to the detection of the robbers ; moreover, the Ramoossies reckon it unpropitious to enter a house on such an errand with their shoes on. Those of the party who only carry sticks now collect a parcel of stones of two or three pounds' weight each—which they take with them to the village to be used as missiles. If the Ramoossies be of opinion that they will not be recognised, from the village being a great distance from their homes, they do not muffle up their faces,—otherwise they do so,—at all events the person who is employed as spy on the occasion, keeps his face well wrapped up. Thus far prepared, all of them turning towards the town, and looking in the direction of the house they are going to assail (should it be strong and they expect resistance) they throw themselves into a supplicating posture, and making repeated obeisances, invoke the tutelary spirit of the place to favor their undertaking, and crown their exertions with complete success, that they may obtain a stock of valuable articles to enable them to maintain themselves, and their wives and children for a long time—one of the party having taken off his turban, it is cut into three, five, or seven pieces, but never into more—each piece being one and a half, three, or five cubits in length.* These are twisted to form so many torches (Kakrahs Tembahs) which are well moistened with the ghee they take along with them. Turning their backs to the village, a couple of them hold a cloth to shelter the person who has the tinder box, while he is striking fire, and lighting the torches,—but they are very cautious about preventing the torches blazing into a flame, in case they should be

* They like odd numbers.

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seen by the villagers. These are, therefore, preserved in a smothered state, and kept under their clothes. They now approach rapidly towards the house and post a couple of men as sentries in each street, or lane, leading to it, and the torches being lighted, they rush into the house if the door be open leaving a strong party outside for their protection against an attack from the villagers,—should it be shut, they will break it open with their hatchets and stones, if they cannot succeed in getting into the interior of the dwelling by climbing over the wall.

The first object of the gang upon their entrance, is to prevent any of the inmates of the house from effecting their escape outside to give intimation to the inhabitants, or into the interior, or to the top of the house, as they might carry off some valuable property, and conceal it. Besides, the clothes and ornaments on their persons would be lost to the robbers. Therefore, if there appear to be any intention on the part of the inmates of the house to move off, or to attempt any resistance, the members of the gang immediately commence calling out to each other to seize and beat them! After seizing them, they bring them to the front, or probably, shut them up in a room, till the gang have searched every place for valuables, and should they have reason to suppose that any of the articles have been hidden, they lay hold of either of the men or females, and threaten them with the most severe and cruel punishment, holding their naked swords on the unfortunate people's throats, and often tearing away an infant from its mother's arms, and holding it by one of its legs, swinging it round, threaten to terminate its existence by knocking its head against a pillar, if they do not comply with their wishes. This, in general, tends to obtain the information they require, and puts into their possession the articles they were in search of. The men, and, sometimes the women, are stripped naked, should their clothes, be new, or nearly so; and, not unfrequently, the ornaments are torn so forcibly from the women's ears and noses, that the sores, consequently produced, do not heal for several months. It is very seldom that the Ramoossies proceed so far as to violate the chastity of females, although there have been many instances of their doing so within these three years in the Punt Suchew's country; but if any of the men are courageous enough to make an obstinate struggle in defence of their property, they are frequently wounded or killed, and the women aware of the risk their husbands, fathers, and sons, incur when their dwelling is attacked by a gang of robbers, exert themselves to get the male part of the

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family to retire to conceal themselves before the robbers can enter, hoping that they will be able more readily to excite the sympathy and compassion of the members of the gang, and more quickly pacify them. When those perceive that they can range about the dwelling without danger to themselves, they are less likely to treat the alarmed and weeping females with severity and rigour; often have I heard persons describe or rather attempt to describe the agonizing feelings, which both themselves and their females experienced when they saw the band of robbers enter the house and rushing to seize them. What must be the state of the husband when he beholds his wife or daughter whom he loves and adores, writhing under the tortures of these ruffians. When the gang have collected all the property they consider worth their trouble to carry away, five or six of the most active of the robbers remain in the house, or at the entrance, as a guard over the people, till the rest of the party have moved off by a different road from that by which they came and have got to the distance of five or six hundred yards, and then this rear guard retreat with as much rapidity as they can in an opposite direction, and rejoin their friends at the place previously settled on. They take up their shoes and sword scabbards, and then set out for their home, and make a division of the property very likely in a ravine in the vicinity, from whence they disperse, every man proceeding to his own house.

The man who gave up his turban to be converted into torches, secures the best turban he can find among the plundered property,—a perquisite to which he is entitled, and it is always the same person who devotes his turban to the flames, on such occasions. A rather notorious character named Suttoo Bhandollkar, but nick-named Suttoo jubber toottah, (from having received a wound in the jaw many years' ago in a skirmish with the Nizam's troops near Parinda, and who has sacrificed many an old turban in this way,) is at present in the Poona Jail, having been a staunch and active friend of his old companion Oomiah, during the late disturbance in the Poona district.

Should the Naik who employed the gang, not have accompanied them on their trip, the property is either taken to his house, or distributed among the party in some jungle, or ravine, at no very great distance from his dwelling. The Naik, should he for his own security deem it necessary, makes each man of the party take an oath that he will abstain from touchiug spirituous liquor for the period of one, two, or three months. This is in case they should, in a state of intoxication begin to abuse each other, and disclose the robbery by

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remarks on the unfair division of the spoil, or the unjust estimation of the exertions and merits of individuals,—such disputes might lead to blows, and some of the villagers might learn all the particulars connected with the robbery, and report it.

Sometimes the inmates of a house attacked by a gang of Ramoossies, make a bold and resolute stand in defence of their property, and prevent the gang from entering into the interior of the dwelling, and we find that the inhabitants are so spirited as to turn out to support their friends, and consequently, a skirmish takes place between the villagers and plunderers. It is only on the occasion of such a general alarm and being closely pressed, that the gang are induced to bring their match-locks into play, as they prefer pelting the people with stones, &c. to firing their muskets, which would be heard at a distance and probably lead to their being surrounded by all the inhabitants. In the event of a Ramoossy being killed in one of those skirmishes, the gang carry the dead body with them. However should they be so pushed by the people of the town as not to be able to effect this, they cut the head off and take it with them; even should one of the gang be badly wounded, and likely to be captured, by the pursuing party, they will cut his head off to prevent the body being recognised. Should they have sufficient time to carry off their dead, they bury the body in a thicket, or in the bed of a nullah in some unfrequented spot. I know several instances of their having acted in this manner, since we took possession of the country.

It has been observed before, that when the Romoossies go to a distance from their homes to plunder, they do not always cover their faces. However, they speak to each other in their own language—yet they never mention each others names at such a moment. But if one of them discovers where valuable property is concealed, he calls out in their own speech, "tell the head man that there is gold or silver here;" when they plunder a house at no great distance from their own village, they muffle their faces up very closely, and frequently speak to each other in the Hindoostany language, or make use of a few Kanarese words. Their intention in doing so, is of course, to make it be supposed that they could not have been Ramoossies, who committed the Durrorah, and that they must have been strangers.

They sometimes approach a village in small parties from different directions, and if it is necessary for any of them to advance to reconoitre the place they intend to plunder, they communicate their movements to each other when at a distance, by imitating the bark-

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ing and howling of jackalls, or the chirping, or whistling of birds. In the event of their being surprised, (and having separated during their flight,) they have recourse to their barking and chirping system for the same purpose. The Mangs also adopt this mode of communicating with each other, when similarly employed. It requires a very practised ear to detect the imposition, so successful are these people in imitating the cry of different birds and quadrupeds.

When a few travellers for the sake of security put up for the night in front of a house in the centre of a village, or under a tree close to the houses, the robbers apprehensive of being recognised, or meeting with too much opposition, will refrain from molesting them. However, shortly after midnight they will disturb the crows in the adjoining trees by throwing stones at them, with the view of making the travellers suppose it is day light, or they will imitate the cawing of the crows to delude them, and when they have proceeded on their journey, and have reached a jungle or ravine, in which the robbers had previously posted themselves, they are attacked and plundered in the dark.

The Ramoossies amongst themselves seldom estimate the property they obtain by plunder, being worth to them much above half of its intrinsic value. They say what is very true, "who will give a robber the full value of an article, when it is known he must sell such article by stealth," and that, owing to some unforeseen event, both seller and buyer may be involved in much trouble. Gold and silver ornaments plundered at a distance, they contrive to dispose of at a pretty fair price, this they partly effect through the agency of some shroffs, or money dealers. Between some of these and the Ramoossy Naiks, there is frequently a good understanding. The dealings of these people are principally with the agricultural classes. They are in the habit of receiving gold and silver articles in pawn for the money, they are called on to advance, so that they have a greater facility in disposing of articles tendered for sale by the Ramoossies, or any other robbers.

The village goldsmith is, at times, employed to break up ornaments obtained in the neighbourhood and he makes up new ones of a different description—the Ramoossy paying him the usual price of his labour. He presents him also with a turban or piece of cloth, worth two or three rupees. The goldsmith having received the turban, and probably made away with a few grains of gold, is satisfied that it is to his advantage to keep silence on the subject.

A man that had been residing at Sakoordy, and whom Oomiah

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considered trust-worthy, was employed to dispose of a number of gold and silver ornaments about three years' ago. This man proceeded to Phultun with his charge, but never returned to Sakoordy nor has any information been gained respecting him, or the property he carried with him. Had this man however, resolved on acting a more honest part in the discharge of his master's service, he would have proceeded to Phultun, said he was a traveller from some distant part of the country, and would have cautiously avoided mentioning Oomiah's name, as doing so might have immediately led to suspicion. When it is required to dispose of such articles, it is represented that it is to enable a man to marry one of his children; or that they had been received as part payment, of a debt, or bought on speculation; or very likely, the man will remark that they had been many years in possession of the family, but still, for the sake of preserving their character, they are anxious that the sale of their property should not be so publicly proclaimed in their own village.

The clothes they get into their possession, if they cannot dispose of them immediately, they are obliged to give in charge to some confidential friend, who either deposites them in his house, or in a secret place in the vicinity. Koonbys, and even Chumbars or Moochies, are frequently intrusted with bales of cloth; for the Ramoossy labours under the alarm of having his house searched, and the proof of his guilt being established. They occasionally sell their clothes to a class of Seempies (tailors,) whose trade it is to travel about selling cloth to the inhabitants of the surrounding small villages, and who are regular attendants at the weekly fairs held in rotation in the different Kusbahs, or market towns. The Ramoossies will let one of these tailors have a new turban worth eighteen or twenty rupees, for ten and twelve rupees, and other clothes in the same proportion: a shawl worth two hundred, or two hundred and twenty five rupees, they will part with for seventy, a hundred, or a hundred and twenty rupees. The Marwarry shop keepers, especially in the small villages, are in general in close connection with the Ramoossies. The Marwarry will purchase their brass and copper pots, which they sell to the Kassaurs, or Tambutgars, (coppersmiths) of the principal town in their vicinity. The Marwarry, if he is questioned on the subject, says a poor traveller gave him the articles in return for a certain quantity of floor or grain. This Marwarry also purchases some of the inferior gold and silver ornaments, and clothes, that have been sometime in use. In fact, some, of the Marwarry shopkeepers in the villages in the hills around Poona, drive a rather

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profitable trade in this way. Their dealings with the Ramoossies are in general so extremely well managed, that it is seldom they can be detected and punished for disposing of stolen property. Any valuable property that has been plundered in the Poona district, will be sold in the Satara or Ahmednuggur district, and that plundered in the Satara, sold in the Poona district.

There are some Ramoossies who prefer plundering escorts in the day time proceeding with treasure and other valuables—and who seldom, if ever, join in committing Durrorahs at night. The noted old rogue, Hybutty Shertore, at present residing at Wulty near Poona, is one of those who used formerly to be very actively engaged in this way. Many stories are told of his adventures by the Ramoossies. He was patronized and protected by Trimbuckjee Danglia, the great favorite of Bajee Row, the Ex-Peshwa. Hybutty during the time he used to be running about the country to save his life, has had many narrow escapes. He was severely wounded on one occasion by some Arabs employed to assassinate him; one of his three faithful companions was killed on the spot, but his other two friends carried him off in safety from his pursuers. On another occasion he was condemned to be blown from the muzzle of a gun on the hill fort of Lhogur, whither he was sent to undergo the punishment. Hybutty however contrived to elude the vigilance of his guard, and with considerable difficulty, lowered himself over the walls of the fort by means of his turban. He was nearly blind the last time I saw him.

There are many Ramoossies who are extremely expert at committing petty thefts, and who never venture to join their friends in the commission of a robbery on an extensive scale. In fact they are all thieves with scarcely an exception, and even the most respectable of them in appearance who apparently conduct themselves with propriety, occasionally receive a share of some Durrorah from their friends, or dependants; or the particulars of a robbery having come to their knowledge, a suitable offering is presented to ensure silence and good will on their part.

Durrorahs are only committed on dark nights, or during the wane of the moon, when she rises about three in the morning. This is to admit of their retiring from the house they may have plundered without being seen, and consequently preventing the inhabitants of the village from pursuing them. During the monsoon, or wet weather they seldom make any excursions for plunder, as there would be such a facility of tracking them to the entrance of their own houses,

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besides, the risk of being checked in their return by the sudden rise of a nulla or river, from a fall of rain, operates to deter them from venturing out in rainy weather.

CHAPTER III.

They conceal stolen property.—Also money in the hills.—Seldom lend money at interest, dreading the consequences.—Are uncautious robbers.—Place great faith in fortune.—Their perplexity when seized respecting how they ought to act.—Their opinion respecting the punishments they have to undergo.—Anecdote of a Koley.—The cruel manner in which they were treated by former Government Jageerdars.—Patells, &c. received a share of plundered property, or a consideration from the Naiks for protection afforded.—The mode of punishing those that infringe the rules of the tribe.—Admission of converts from higher classes.—Their character and that of their women—and the deities they worship.

It has been observed before that they seldom conceal stolen property in their own houses (unless it has been brought from a great distance;) so that if the real robber has been traced, and his house searched, no article is found to prove his having been engaged in the robbery. The money a Ramoossy accumulates, he almost invariably buries under ground in some unfrequented ravine, or thicket;* and the spot is only known to himself.

Although lending money at interest is so very common and profitable a trade at times in India, the Ramoossy dares not venture to traffic with his ill-gotten stock, aware he would be suspected of having in his possession money which he had plundered from some known, or unknown persons, and which might attract the attention of the Police to his dealings. However, after a few years, some of them do occasionally make advances to the farmers at the usual rate of interest; but this is on a very limited scale being unable to keep any accounts operating as a check on such speculations—very few, indeed, of the Ramoossies can read or write; their degraded caste, their idle habits, the nature of their pursuits, and general poverty, presenting obstacles to the spread of education amongst them—although they are not insensible to the advantages derived from it.

* In the month of November, last year, in the morning on which they were removing Essoo Neekary, one of Oomiah's principal Naiks from the jail at Poona to the place of execution, he sent to request that the Assistant Judge might speak with him;—and upon Mr. L. coming towards him, Essoo said, he had a considerable sum of money buried in a hill near the fort of Singhur. (Essoo resided in a small village a short distance from this fort) which he was anxious to have dug up. Mr. L. told him that it was now too late to do any thing about recovering it, as he had no authority to listen to any such representations nor to delay the execution. This explanation had scarcely been repeated when, unexpectedly to Mr. L. the unfortunate man, bent himself nearly double and rushed with great impetuosity towards a pillar, against which he hit his head and dropped down senseless on the floor.

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The Ramoossies as robbers, appear at times to be singularly imprudent and thoughtless, neglecting to adopt some ordinary, and to them necessary precautions, by making an early display of the articles plundered, or putting part of the property into the hands of individuals for the purpose of being disposed of who are unacquainted with the particulars of the robbery. There have been instances, of valuable gold ornaments set with jewels, and plundered only at an inconsiderable distance from Poona, having been offered for sale at the verp shop in that capital, from which they had been despatched but a very short time before; thus furnishing the owner with an easy and unexpected opportunity of recovering part of that treasure, which he had considered as lost for ever.

The Ramoossies always speak of their Kuppall, Dyuh, Nusseeb, that is, trusting to fate, destiny, and chance: so much confidence do they place in fortune. There are many chances against its being discovered who committed a robbery, and in favour of the robbers not being caught; then the difficulty of convicting them of the crime, the chances of their being able by means of some friends, to succeed in bribing, or interesting some of the persons in the employ of Government in their behalf; they have still hope of being able to effect their escape, should they be seized, to establish an alibi, or, probably, admitting the truth of some trifling and unimportant part of the charge, they then call out loudly, that their enemies are trying to ruin them, by a most tyrannical proceeding on their part. They offer to produce certain persons who can prove the falsity of the charge, and persons will be produced to swear to the innocence of the prisoner. Perjury is reckoned but a very trifling offence among the natives. It is considered, in general, a meritorious act to save a friend by swearing to an untruth; for which, by the bye many an unprincipled man is well rewarded. It has, hence become a common practice in our Adawluts or courts of justice to invalidate evidence by false testimony. It may be further noticed that when they perceive no hope remaining of their escape from punishment, they will pretend to communicate all the information that may be required of them connected with the robbery, provided they are not molested or injured, that is obtaining a pardon, they make confessions which they often retract. They will admit the truth of them afterwards, and before much time has elapsed, they will again deny the whole.

(To be continued.)

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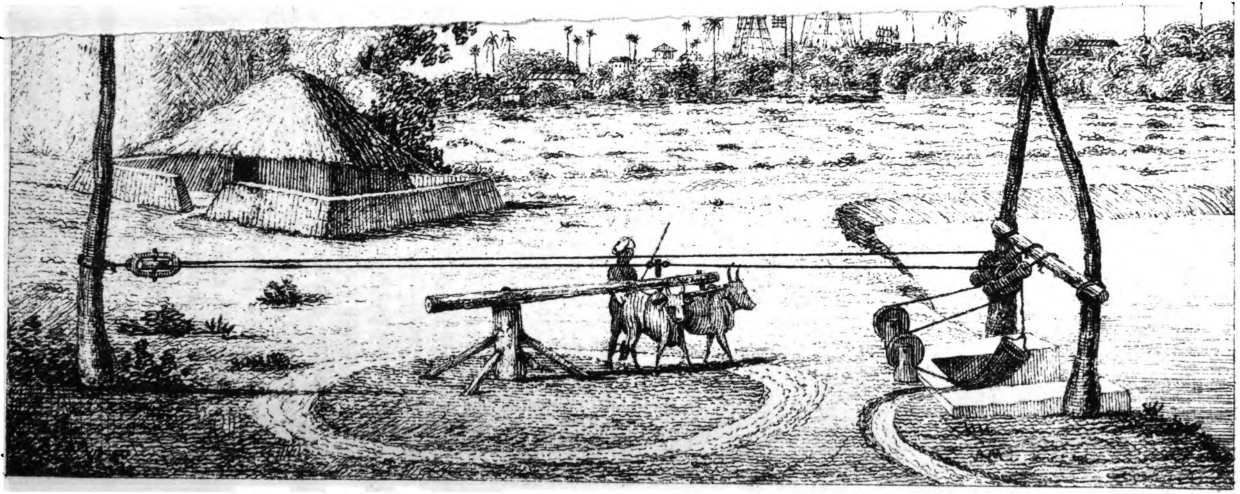

Sketch of a Machine for drawing Water. by Mechanicus.

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II.—*On the mode of raising Water in India.*

To The Editor of the Madras Journal

of Literature and Science.

Sir,

I beg leave to forward herewith to be deposited in the museum of the Literary Society a rustic model of a machine for raising water.

2. I have the pleasure to send also a coloured sketch shewing the manner in which the principles of the machine may with facility be reduced to practice; and a guide sketch with references to the several parts of the mechanism. Where there are trees upon the spot, they may be made part and parcel of the machine itself without injury to them; and where there are not, strong posts or trunks of trees, sunk in the ground, will prove effectual substitutes.

3. A post A, see guide sketch, firmly fixed and braced, forms the centre point on which the mill beam or lever B. acts. The post is shaped into the form of a pin at its upper end, and this pin passes through a hole made near the end of the lever B. The other end of the lever has affixed to it, in the usual manner, the draft yoke for the bullocks;—and it has several holes pierced along it to suit different depths of water. Suppose the diameter of the mill track to be 30 feet; then the pin and swivel C. fixed at 4, may be assumed to raise water to the height of 25 feet; but if the pin and swivel C. be fixed at 1, it may then be assumed to raise water to the height of only 10 feet. It is clear that water may be raised to any height within the diameter of the mill track, simply by shifting the swivel C. along the beam, nearer to the centre or further from it, for if it be fixed at 1, and suppose 1 to be 5 feet from the centre, then when the beam is in the opposite part of the mill track, that point 1 will be 5 feet from the centre on the left hand of the sketch, or 10 feet from its original position; and so on with respect to any other distance the swivel may be fixed at, the water being necessarily raised to this height because it is to the swivel that the bag rope is attached. The enlarged sketch shews the form of the swivel and pin more accurately. The pin must be made of Iron, and should fit tight into the beam or lever.

4. The ropes are double for each bag. The lines D. D. represent two ropes, one for raising the water, the other to be fixed to the spout of the bag for discharging the water. These ropes run parallel to, and along with each other through the pullies E. F. from C,

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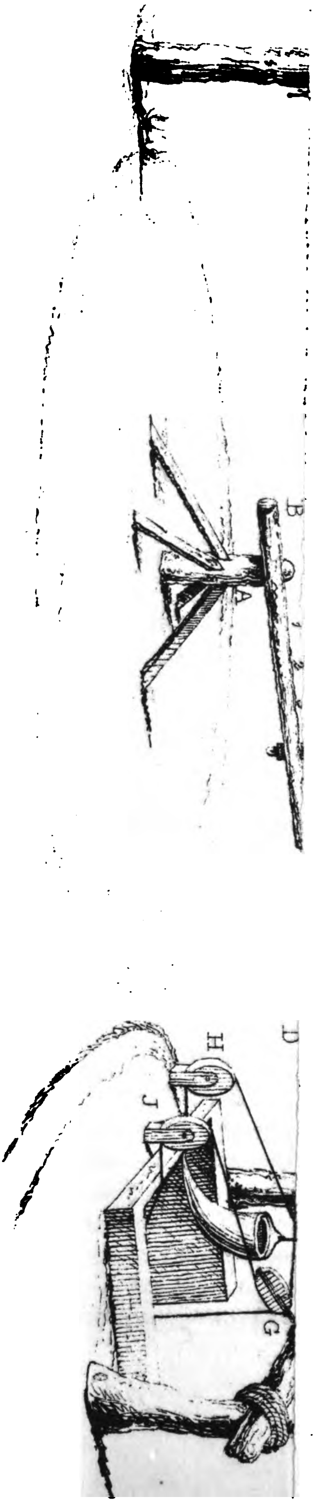
and from C. through the pully G. but at F. and G. they separate, the bag rope descends with the bag direct into the well, the other makes a turn round the pulley H. or J. and is attached to the spout of its own bucket. By this arrangement the machine itself performs the office of discharging the water and needs no attendance as the sketch shows. The ropes leading through pullies on opposite sides of the mill track occasions an alternate motion, so that while one bag is filling, discharging, or rising, the other bag has an action directly the reverse. The sketch itself may sufficiently serve to explain further arrangements, and save the necessity of further description.

5. In this machine I have studied to combine simplicity of principle with equal simplicity of construction. But although the sketch and model exhibit rudeness of workmanship which indicates how little mechanical skill is required in order to make the machine of practical utility in every village throughout India, those who have the means and might choose to adopt the principle might improve upon the workmanship, and construct an effective machine for raising water, at a comparatively small expense. The only parts necessarily requiring superior workmanship are the centre on which the beam B. works, and the pullies E. F. G. Instead of a wooden pin on the top of the post A. an iron one might be substituted, and it might work in an iron or brass bouche or socket let into the beam B. or any other better construction might be adopted; and the rollers might have polished steel centres working in gudgeons of brass. Both these arrangements would decrease friction and add to durability. The pullies E. F. G. ought to be as large as conveniently practicable to lessen their wear and tear. They should hang by a rope or chain to allow them a vibratory motion to suit the different angles made by the draught rope in different parts of the mill track. The grooves of the pulley rollers should be deep to prevent the ropes slipping out of them. I shall now proceed to estimate the value of this machine comparatively with other machines employed for raising water.

6. And in the first place let us enter into the consideration of Bhowries, (bag or bucket machines) Pickottas, (levers) and the Europe pump.

7. The Bhowrie or Bucket machine has its effect increased by the inclined plane down which the cattle travel to raise the water, and the increase of effect is proportionate to the angle of inclination; the greater the angle within practicable limits, the greater the effect, and vice versa.



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8. A gentleman at Bellary has in his garden two wells, and two Bhowries. In the following experiments the depth of water in one well was 24 feet, and the angle of the inclined plane 14 degrees. In the other the depth of water was 27 feet; and the inclined plane 19 degrees. The same bucket was used at both wells and the quantity of water each time discharged was 650 lbs. The following was the rate of performance.

Well, angle 14°	times	minutes		
Two pairs of Bullocks raised the Bucket	10 in	5	24 feet	high.
One pair of Do..........Do.......	6 in	5	Do.	Do.
Well, angle 19°	**times**	**minutes**		
Two pairs of Bullocks raised the Bucket	9 in	5	27 feet	high.
One pair of Do..........Do.......	6 in	5	Do.	Do

In both which cases it will be observed that one pair of Bullocks raise a much larger proportionate quantity of water than two pairs.

9. In another Bhowrie the common every day work was, to raise a bucket discharging 67½ gallons (689) lbs. once a minute from a depth of 20 feet. The two bullocks worked 8 hours a day and the foregoing had been their daily performance for 6 months prior to the experiment being taken. Angle of plane 19°.

10. "Three men and two oxen work a môt (Bhowrie) from "morning till evening with a refreshment of only about ¾ of an "hour. In a well 33 feet from the surface to the water, a môt in "half an hour drew 7210 lbs." Vol. 2, Calcutta gleanings in Science page 29.

11. In 1831 I had occasion to ascertain the quantity of water drawn daily for the use of the Government Gardens at Madras, and I found that a pickotta (lever machine) worked by 3 men discharged 6 times per minute, 75 lbs. of water raising it 14 feet high.

12. "A latha (Pickotta) in a well from which it was 36 feet to the water from the surface in half an hour drew 1357 lbs. avoirdupois of water." Vol. 2 Cal. glean. Science, Page 29.

13. As the gravity, or weight of either man or beast, is far more effectual in mechanics, than the exertion of simple muscular effort, I shall conclude these examples of practical data by two such cases from Brewster's Ferguson's Lectures. Vol. 2 P. 9. Ed. 1823. I presume that pumps were used in both these instances.

14. "According to Dr. Robison a feeble old man raised 7 cubic feet of water, =437½ pounds avoirdupois 11½ feet high in a mi-

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nute, for 8 or 10 hours a day, by walking backwards and forwards on a lever."

15. "A young man weighing 135 lbs. and carrying 30 lbs. raised 9¼ cubic feet of water = 578$\frac{1}{10}$lbs. avoirdupois, 11½ feet high for 10 hours a day without being fatigued.

16. Before I proceed to remark upon the data thus laid down, I must insert a few experiments on the strength of Bullocks with which I have been favoured. They were made a few years ago at Seringapatam, by a gentleman who had given much attention to the subject and there is every reason therefore to believe that they have been accurately made and may be depended on, while they are the more valuable because they are sound and of direct practical utility. The cattle employed were of 3 different sizes;—large, inferior and small. The large cattle weighed about 850 lbs. each, the inferior about 700 lbs. each, the small about 500 lbs. each. They drew up out of a dry well weights by means of a rope and pulley; they were yoked in pairs as usual; but had a 56lb. weight hung to the yoke to assist traction.

The large size	pair	drew up	with tolerable ease	430 lbs.	with difficulty	486 lbs.
The inferior	do.	do.	do.	346	do.	402
The small	do.	do.	do.	274	do.	386
A very large pair of Nellore Bullocks		do.	do.	627	do.	682

17. The dynamical unit of writers on mechanics varies. I shall adopt that of Mr. Watts in estimating the power of his steam engines, which is equivalent, to 33,000 lbs. raised one foot high per minute, or to a force of traction of 150 lbs. moving at the rate of 2½ miles an hour for a one horse power. Let also 6 men be considered equal to one horse, and the dynamical unit for one man will be 5,500 lbs. raised one foot high in one minute, which is indeed a very high estimate, to be attained in practice only by the physical weight or gravity of a man acting in connexion with his muscular effort; but if any one prefer a different unit or equivalent as the measure of force, it will be easy for him to reduce the following numbers.

18. I shall now collect in one view the relative values of the foregoing examples.

	Raised one foot high in one minute.
A one horse power is equal to	33,000 lbs.
The power of one man is equal to	5,500
The two pairs of Bullocks (8) well angle 14°	31,200
The one pair do. „ do.	18,720

The two pairs do. „ well angle 19°	....	**31,590**
The one pair of do. „ do.	....	**21,060**
The Bhowrie (9) one pair of Bullocks	....	**13,780**
The 3 men and two oxen (10) (Bengal)	....	**7,931**
The pickotta worked by 3 men (11)	......	**6,300**
The do. worked by 2 men (12) (Bengal)	....	**1,628**
The feeble old man (14) (Europe)	....	**5,031**
The young man (15) (Europe)	....	**6,647**

19. It will be observed how fluctuating and discrepant these results are, but so they must of necessity be:—the workmanship and nature of the machine will make some difference, and the variation of animal strength and condition will make it much greater. The two last examples seem to imply that the Pickotta might be much improved, for one man at home appears by the last example to have done as much work as 3 men in the Government Gardens, at Madras (11).—The Bengal practice exhibits a very low result.

20. We may now proceed to investigate the probable performance of a machine on the principle of the model herewith submitted.

21. The Bullocks employed in the Bhowrie experiments Para. 8 were of a large size and the quantity of water drawn up by them was 650 lbs. But large sized bullocks according to the experiments of Para. 16 drew up and with difficulty a weight of only 486 lbs. It is clear therefore that the force of traction on a horizontal plane is far less than in a Bhowrie and that it cannot be estimated so high as in the foregoing experiment. The gentleman to whose kindness I am indebted for these trials thought that ⅓ of 430 lbs. (the smaller weight) would be a fair estimate for continued labour. I think so too; let us therefore fix the force of traction for a large sized pair of Bullocks at 140 lbs.

22. I have ascertained from observation that Bullocks walk in a mill track at the rate of 150 to 270 feet per minute according to the lightness or laboriousness of the work to be performed. As a further datum let us therefore fix the measure of force for one pair of strong Bullocks at 140 lbs. moving at the velocity of 200 feet per minute.

23. Then suppose a machine on the plan of the model to raise water 27 feet high. Its effect would be as follows.—The pin and swivel C. must be fixed at 13 feet 6 inches from the centre, and as this happens to be a convenient mean radius for the diameter of the mill track, the force of traction, and power of leverage will be equal. The velocity of the Bullocks being 200 feet

per minute it may be found by a simple process that they go round 2.37 times per minute and consequently raise each bucket an equal number of times, or 140 lbs. of water 4.74 times per minute, 27 feet high, which is equal to the performance of a Bhowrie. If the value be resolved, it will be found equivalent to 17.917 lbs. raised one foot high per minute: if 2 pairs of Bullocks be employed the effect will be doubled.

24. As I have made no allowance for friction, nor accidents, I know not but this estimate may be higher than what would result in practice. Some indeed may think that because the arrangement provides a double action and because it has somewhat of a mill-like form, it ought to do more work than the simple unartificial Bhowrie. It should be considered that the circumference of the mill-track occasions an additional space of ground to be passed over, and that the force of traction on a horizontal plane is far less than down a slope. If therefore the performance at all equals that of a Bhowrie, the arrangement ought to be considered good, and the machine unobjectionable.

25. The fact is that both the Bhowrie and Pickotta are constructed on principles of the soundest science. They exemplify the finest adaptation of means to the end; of the application of animal strength to the production of mechanical power. They are, it is true, in construction, simplicity itself; but with all our science they leave very far behind our common applications of animal power to the production of mechanical effect. Simplicity as contradistinguished from complexity, is the perfection of science. What can be simpler in principle than the expansion of mercury and water by heat, and what, as applied to practical and scientific purposes, is more beautiful, or more efficient than the barometer and Steam Engine?—A bullock walks down an inclined plane and by a rope passing over a pulley raises up a bucket of water far heavier than he could raise by mere muscular effort. Multiply wheels and levers and complicated apparatus as much as you please, and you will never make the bullock perform more work than by his simple rope and bucket;—you may enable him by the intervention of machinery to raise a load a thousand times heavier, but he will be a thousand times longer in raising it, and you superadd the friction of the machine, which, in complicated engines, is not a trifle. The same principles applies, whether you have two wheels or five hundred. The ultimate effect, in the same space of time will and must be less than that wherein

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the application of the first power is direct and unembarrassed with the friction of machinery, all other things being equal.

26. I know of one method only by which the common Bhowrie and Pickotta might be made to perform more work in an equal time, but as this paper is sufficiently long, I reserve for a future communication what I may have to say on that point.

MADRAS, 1st February, 1834. } MECHANICUS.

III.—*Translation of an Extract from Tohfet al Akbar; or, a history of the Rulers, Rajahs and Jaghiredars of the Carnatic. By an Officer of the Madras Army.*

To The Secretary of the Madras Literary Society.

SIR,

I beg to forward you two literally translated extracts from a Persian work in manuscript, written about the year 1821, intitled the "Tohfet al Akbar," and which purports to be a history of the Rulers, Rajahs, and Jaghiredars of the Carnatic. These extracts profess to pourtray the characters of two eminent men, whose names will live in the history of India, Sir Thomas Munro and Sir John Malcolm—and, as genuine specimens of the persian literature of the present day, and not without intrinsic merit, they may probably be thought worthy of insertion in the Madras Literary Journal. They possess, however, much greater interest as exhibiting the unbiassed sentiments of a native of India on the qualities and virtues of those distinguished individuals, whose acts have h d such an influential effect on the destinies of India, and the establishment of the Anglo-Indian empire. These translations are from the pen of a young Madras Officer, a friend of mine, now serving abroad, whose talents and attainments as an orientalist are, I am happy to say, gradually becoming appreciated. In furnishing them to me he has forbidden my publishing them with his name, or I should have sent them to you under it, and without this preface from myself.

I have the honor to be,
Sir,
Your very obedient Servant.
GEO. NORTON.

MADRAS, *7th Jan.* 1834. }

Mention of Colonel Thomas Munro, his habits and employments.

"This humblest of mortals, at a remote period when Colonel

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Thomas Munro was a Quarter Master of Brigade, was acquainted with his quickness of comprehension and sound judgment; and knew him to be well skilled in the languages of Persia and India; it is not likely at the present time that these languages are obliterated from the page of his memory."

"His disposition was bent on rectitude of conduct and seeking out justice."

"He took great pains in the acquirement of Persian and translated difficult and abstruse epistles without the assistance of a Moonshee and comprehended their purport with great celerity."

"In Lord Hobart's time he was appointed to the collectorship of Bellary."

"It has been heard, from persons worthy of credit, that Colonel Munro was indefatigable in the performance of his duties as collector of Bellary and transacted public business in so satisfactory a manner that not a murmur was ever heard to escape the lips of the Ryots."

"He was accustomed to hear and decide in person Zillah matters, and never suffered any negligence to occur in the investigation and administration of justice to the oppressed and finished all matters of business with dispatch."

To a knowledge of the duties of his office he added the qualities of bravery and courage."

"He was employed several years in the collectorship of Cuddapah. Although, four years ago Colonel Munro was appointed in Europe to a high station and returned to this country with Governor Elliot, and endeavoured, to the utmost of his power, to introduce a system, invented by himself, into the management of the affairs of the Carnatic and the Balaghat, yet, through want of unanimity and concurrence of several gentlemen of confined views, the wise designs of Colonel Munro made no further progress: and the system, he had set his heart upon, came not into practice."

"On this account he became constantly thoughtful and amazed and eventually, a short time ago, departed to Europe in this state of grief."

The Colonel is a man of patience and penetration.

Thanks be to Allah! it has been heard from persons worthy of belief that he is coming out as Governor of Madras.

Sir John Malcolm.

"Sir John Malcolm is one of the exalted of Europe. It is necessary to premise that a description of the beauties of his noble vir-

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tues and lordly generosity is far beyond the scope of my pen. Lofty minded he values the wealth of the world as worthless gravel."

"Eminently wise he enters into the comprehension of weighty matters and accomplishes them with ease and facility."

"The power of his presence and conversation is so great that after one or two interviews the stony heart (of his hearer) melting as wax yeilds and is moulded accordingly."

"Anterior to these times, Sir John Malcolm, through reason of superior capability and fitness, has at three different periods travelled to the regions of Tsfahan and transacted the affairs of the Company to their satisfaction, and has on several occasions been admitted into the presence of Futteh Ali Shah, King of Iran, and honored and exalted by his princely munificence."

"The high born Oomras and inhabitants of Iran were beyond bounds desirous of his society. In journeying to Iran he experienced many dangers and difficulties. By bestowing "Nazrs" and Maums he is celebrated for generosity and liberality."

"The Persian language falls from his lips with the perfection of eloquence, he is also acquainted with the languages of India—in addition to perfection of knowledge he possesses the gem of valor and courage. In diplomacy and political affairs, he is sagacious and discerning."

"Notwithstanding his elevated rank he is entirely divest of pride and self importance; and manifests to his confidants more kindness and condescension than a father."

"He is naturally partial to travelling and field sports, and esteems a good horseman."

"He exerts himself to the utmost in completing any matter to which he has once turned his attention. He regards with a favorable eye the just privileges of old servants, and never rejects a beggar from the door of his wealth.

"In the society of his equals Sir John Malcolm evinces such warmth and vivacity that every individual becomes desirous of his company and eloquent in his praise."

"In short, this historian has never, at any time observed the brow of this celebrated chief ruffled but at all times unclouded and his countenance cheerful."

"In Governor Elliot's time the seizure of the Mahratta country which was fallen into the hands of the Company was entirely brought about by his agency."

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"Although this destitute (the writer) during his lifetime has met face to face many chiefs the like of Sir John Malcolm he has never seen."

QUATRAIN.

"General Malcolm is the benefactor of the age
" His good name is as the sun to the world;
" O God! continually increase his life and prosperity
" So long as the moon, the earth and heavens revolve."

We have much pleasure, at the request of a Subscriber, in giving insertion to the following interesting letter extracted from the Cape of Good Hope Literary Gazette.—ED.

IV.—MARINE BAROMETER,—THEORY OF STORMS, ETC.

To the Editor of the Literary Gazette.

Newlands, 18*th June*, 1833.

SIR,—I should on no account have acceded to your request of me to sanction the re-publication of a letter which appeared in the *South African Chronicle* nearly nine years ago, for I have not the vanity to think that any production of my pen can be worth a second perusal, had I not been influenced by the following considerations which you have so particularly brought under my notice;—first, that there are many gentlemen from India now in this colony for whose character and acquirements I have a high respect, who have expressed a desire to this effect,—secondly, that some of the arguments and facts it contains have been deemed of sufficient importance to require a more extended promulgation. Under these circumstances, I have the pleasure to send the letter referred to, *revised*, and very much at your service.

Without, therefore, any further preface, I shall proceed to my remarks on the *Marine Barometer.*

I am, myself, apt to set so high a value on this instrument, from its affording an infallible indication of those dreadful hurricanes, which are so prevalent in the West Indies, the China Seas, the Bay of Bengal, and other parts of the Indian ocean, especially in that part comprised within the islands of Java, Sumatra, and the Isle of France, that I think, any information tending to elucidate its advantages, cannot be too widely promulgated.

Every one at all acquainted with the mechanism of a Barometer, is

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aware that its construction originated in a discovery, that the mean density of the atmosphere is capable of supporting a column of mercury equal to about thirty inches in length, hence it follows that every deviation of the quicksilver from this height, is the result of a correspondent change, in the actual gravity of the surrounding atmosphere, the trifling effect of the cohesive properties of the tube being duly allowed for. But although this may be sufficiently evident to a common observer, it is certain that these changes depend upon so many hidden causes, and are generally so minute that they are scarcely perceptible to the eye, and are frequently unaccompanied by any visible change of the weather. It is a well established fact, that the Barometer undergoes but little or no variation throughout the region of the tropics, unless when it happens to be under the influence of an approaching hurricane, and then it is no less certain that the quicksilver falls rapidly and considerably, a natural consequence it would seem, of the origin of these storms, which exceed in violence those of the more boisterous climates of Europe, as much as the situations in which they are generated, at other times exceed them in mildness. An infinite scope still remains for a philosophical inquiry into the theory of winds, nor have I yet met with any satisfactory explanation of the course of these awful phenomena in the heavens. If I may presume to venture an opinion on so abstruse a subject, I should say that a tropical hurricane is produced by the rays of a vertical sun acting upon some portion of the atmosphere that happens to be unusually loaded with the electric matter so abundantly generated within a few degrees of the equator, whereby a rapid rarefaction of the circumjacent atmosphere takes place, repelling in its escape the surrounding air, until the existing cause has exhausted its influence, when a reaction commences, by the condensed air rushing towards the centre of the atmospheric rarefaction until the equilibrium is restored.

If this theory should prove to be well founded, it would, perhaps, sufficiently account for the great and sudden falling of the quicksilver on such extraordinary occasions ; but, as Dr. Franklin very justly observes, in his Treatise on Electricity, " it is not of much importance to know the manner in which nature executes her laws ; it is enough if we know the laws themselves ;" so it may be said, that on all these occasions, whatever may be the immediate cause of the fall, provided we are aware of what is to follow, we are furnished with all the requisite information to guard us against the

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consequences. A thorough knowledge of these consequences is only to be acquired in the school of experience, and it is perhaps for that reason that I feel anxious to impart the benefits of my own, knowing that the warnings of this infallible monitor, have been but too often fatally slighted. Because, forsooth, that part of the ocean to which these remarks have reference, is frequently sailed over without the occurrence of any thing approaching to a storm, and because the Barometer may, and does frequently remain nearly stationary throughout the whole of this large portion of the voyage to and from India ; is it therefore reasonable to infer that its utility ceases ? on the contrary, the fact of the Barometer not being affected by any change in the atmosphere except when under the influence of an approaching storm, is the very circumstance which, in my opinion, more particularly enhances its value. In high latitudes, the eye of an experienced seaman will prove a tolerably correct substitute for a Barometer, but the tropical hurricane, unlike the storms of higher latitudes, but seldom gives any warning of its approach, and consequently the index of the Barometer affords the only indication to be relied on. The practical inference which I think myself at liberty to draw from these premises is, that whenever, or wherever within the tropics, or rather when in the more immediate neighbourhood of the Equator, a rapid and considerable fall of the quick-silver is observed to take place, it may be taken for granted that an extraordinary degree of rarefaction of the surrounding air is in progress, and that it will speedily be followed by a violent reaction. From that moment the ship may be considered to have perforated the confines of a circle, the centre of which will shortly become the focus of a tornado, which, like the centre of a whirlpool in a different element, cannot be approached but at the hazard of her destruction, a lot which may befal her in spite of any exertions, however indefatigable, of the most skilful and able-bodied crew. I am aware, however, that instances are to be adduced of ships having encountered hurricanes, without sustaining any serious injury, but I have reason to believe that, in most of these instances, if not in all, it would be found, were it possible to ascertain the fact, that the brunt of the storm was in reality not encountered at all, that these ships were throughout far nearer the verge of the circle of rarefaction than its centre, that having been warned of its approach by the Barometer, they had sufficient good sense and foresight not to neglect it. But however this may be, no prudent man in command of a ship, knowing as he must that the lives of all under his command depend

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upon the promptness as well as the wisdom of his decision, will allow himself to be influenced by any such precedents to brave the storm, in order to evince his courage, or through any fastidious fear of committing a blunder, but that, taking the Barometer for his safest, if not his only guide, he will, from the moment of any extraordinary fall, bring his ship to the wind, and make every possible preparation to meet it. Nor will he be diverted from his purpose by any flattering appearances in the heavens.

Even if, at the moment, the sky should be cloudless, the atmosphere motionless, and no other indication of a storm throughout the whole visible horizon, than that which this invaluable instrument affords him, still he will take his measures with the same degree of promptitude and energy, as though the danger had already commenced; and when the flattering gale springs up to favor his course, he will not be tempted to pursue it through any fallacious notion of shortening the period of his voyage; for if my theory be correct, he may rest assured that, the farther he advances, the greater will be the fury of the tempest; that it is a principle of every hurricane, to narrow its sphere in proportion to its duration; and that wherever the storm commences, there will it soonest terminate; and consequently that his easiest way to escape from its fury is to remain as stationary as possible. I should not have dwelt on some of these points, had I not been aware that a notion is but too prevalent among seamen, that scudding before the gale is the shortest way to get out of it, an error which is attended with this additional evil, that those precious moments which intervene between the fall of the quicksilver and the rising of the storm, are expended (perhaps never to be retrieved,) in a proceeding which, in my opinion, is fraught with nothing but mischief.

Neither should I have ventured thus boldly to advance a theory of so much importance to the interests of navigation, were I not prepared to support it by the result of many years experience, while traversing those seas to which it is more immediately applicable.

The following particulars of one of those awful hurricanes which are known to prevail in certain parts of the Indian Ocean at particular seasons of the year, and which it was on this occasion my lot to encounter, will be found to embrace all the most material points on which I have ventured to ground this theory of storms, and I trust that the relation of them will not excite needless apprehensions in the breasts of those, among the fair sex in particular, whose destiny it may be to follow in the tract of my adventures, but rather that

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they will yield their consolation from the reflection that the greater the danger, and the more awful the consequences, the more essential it is that all such particulars should be faithfully recorded as a beacon for the guidance of others under similar trials; knowing, too, as they must, that in traversing the wide expanse of ocean, comprised between England and India, ships will be safe in proportion as the dangers they may have to encounter are accurately described. Under such circumstances, then, to withhold from publication a narrative of facts, however painful its perusal, the object of which is to prevent a recurrence of the misfortunes it details, would be no less inconsistent than to hurl the Barometer into the sea as a useless appendage to a ship, merely because, through idleness or folly, it may sometimes fail to point out the danger, or at other times prove a source of needless alarm.

It was in October of the year 1808, that I left Madras on board one of the East India Company's ships, with eight others under the convoy of a seventy-four gun-ship. On reaching the latitude of 10° south, and the longitude of 78° east, we unfortunately encountered one of the most tremendous hurricanes that was, perhaps, ever experienced by a ship that did not actually founder. It is impossible to convey to the minds of those who have never witnessed such a storm, any adequate idea of the fury with which it blew during the three days and nights of its continuance, the sound resembling more a succession of peals of thunder, or the roaring of cannon, than of wind; whilst the sea formed one continued breach over the ship, sweeping every thing moveable before it. During nearly the whole of this period, the passengers, officers, and crew were, without distinction of persons, employed in pumping or bailing, cutting away masts, securing guns, or in other work essential to the safety of the ship; whilst, owing to the impracticability of getting into the hold through the body of water always lodged on the gun-deck, the chief part of the period was passed without food, or even a drop of water to allay the thirst of the men at the pumps, who were with difficulty, and occasionally could not be prevented from swallowing the bilge water as it ascended from the well. And had it not been for the fortunate circumstances of a quantity of this precious beverage being found in the lockers of the great cabin, which had been bottled and placed there by one of the cabin passengers, which was latterly served out at the pumps in wine-glasses, the probability is that we should have literally perished through the want of a liquid, of which there was an abundance in the hold. Our distress, too,

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was not a little aggravated by two of the twelve-pounders being adrift at once on the gun-deck, causing the greatest consternation lest some port should be stove by their means. Notwithstanding the fore-mast, mizen-mast, main-top-mast, and bowsprit were,at the peril of our lives, alternately cut away, at the close of the third day, we were left with seven feet of water in the hold, and four feet in parts of the gun-deck,frequently with three out of the four pumps choked at a time, and without the slightest prospect of any abatement of the storm. Heaven only knows whether the wonderful alteration which soon took place after the close of this day in our desperate situation, was owing to an especial interference of Providence ; but if the elements by which this globe is governed, in its course, are ever for a moment turned aside for the benefit of frail mortality, a scene was now exhibited which might have been deemed sufficiently appalling by an All-merciful Being, to call forth such an interposition.

I have been a witness to many a distressing scene, on the ocean in the course of my practice, the recollection of which may in some degree account for these serious reflections, and form some apology for their intrusion here. I have seen a ninety-gun ship take fire, burn nearly to the water's edge, and blow up. This noble ship, which had twelve hundred people on board at the time, many of whom perished in her, notwithstanding every possible exertion was made, with the assistance of the engines of thirty sail of the line and frigates to extinguish the flames, and to rescue the men from destruction. I was once awoke out of my sleep by an explosion which proved to arise from the blowing up of an India-man at no great distance from the ship I was in, owing, as it was supposed from the state of the weather, to a flash of lightning having entered the magazine, where five hundred barrels of gunpowder were stowed, destined for the Cape. I need scarcely add that the crew, one hundred in number, were blown into the air, and that not a soul survived to explain the cause, or to record the fact. I was once myself in a ship that was struck by lightning, when some of the masts were shivered into a thousand pieces; and, had not the lightning taken a diagonal direction at the critical moment of its entrance into the body of the ship, the probability is that her destruction would have followed. On another occasion I was in a ship which took fire, when such a formidable volume of flame rushed from the deck beneath, as to render every chance of quenching it

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apparently hopeless: it was, however, eventually got under by an extraordinary display of skill on the part of an individual, backed by the exertions of the crew. I have been in a storm off the Cape, when, after a sudden shift of wind, the commodore of the fleet, in one of the strongest ships ever built, on her first voyage to sea, crowded with passengers from Calcutta, suddenly disappeared, and was never seen or heard of more; the natural inference was, that she had gone down stern foremost, and that every soul on board had perished. I have experienced the shock of an earthquake at sea, several hundred miles from any land, and consequently beyond the reach of any soundings; the fact having subsequently been proved by accounts from Manilla, the nearest land, where an earthquake on the same day, and nearly at the same moment, had occasioned considerable devastation. So violent was the shock we experienced, that one of the ships of the fl et leaked considerably in consequence. It is the only instance of the kind I ever heard of at such a distance from land; I should like, therefore, to see this extraordinary phenomena philosophically accounted for. The water was not unusually agitated, the wind was moderate, the sky serene, and no one indication of such an event throughout the horizon. Was it, allow me to ask, the effect of electricity? If so, I should wish to be informed how the electric fluid came in contact with the ship, for, if the sea became its only conductor, for as the fleet was spread over several miles of space, and every ship more or less sustained the shock, the whole of that part of the ocean must have been impregnated with it. I once landed from a ship in Table Bay, when, within a few hours of my reaching the shore, she parted from her anchors in a sudden north-wester, and became a wreck. My family were all on board at the time, who, after a night of infinite peril, expecting every moment to be their last, the rudder beaten off, and the ship nearly filled with water, were with difficulty rescued from a watery grave. These and many other distressing scenes of a minor description have I witnessed, but never, in the course of my practice, have I been present at one half so distressing, at least to my own feelings, as the one which I have now more immediately under consideration. Those which I have just taken a cursory review of were, it is true, in some instances, infinitely more fatal in their consequences, and in one case, the momentary pang of affliction could not, I admit, have been surpassed; but the scene I have already given an outline of, and am now drawing to a close, was

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one of peculiar excitement, painful feelings, and of heavy responsibility. Well may the Psalmist say. "These men see the works of the Lord, and his wonders in the deep." But, to return from this digression. At the close of the third day of this awful hurricane, the cabins below being no longer habitable, the passengers were crowded into one side of the round-house, as being the only cabin from which the water could be effectually excluded. Here, then, a scene of woe was exhibited which baffles description, and was sufficiently appalling to rend the stoutest heart in twain, more, especially of his on whom all eyes were turned for consolation or assistance, neither of which was it in his power to offer, even to her who had the strongest of all claims on him for both, and whose peculiarly interesting situation demanded the utmost stretch of his sympathy. The ship, if not absolutely water-logged, was now observed to be settling fast forward. Every countenance exhibited a picture of despair; when, at this critical moment, the wind rapidly began to subside, which was no sooner announced to the people at the pumps, than their labours, which, from a feeling of despondency, had previously languished, were resumed with renewed vigor; and such was the rapidity of the change in our favor, that one of the most dreadful of all storms was speedily lulled into a perfect calm, the ship once more rose freely to the sea, and by day-light on the following morning all the water was discharged from her.

The scene which now presented itself was of a very different description, but still it was not without its alloy, and under any other circumstances might have excited feelings of despondency, instead of excess of joy. The ship lay a helpless wreck on the water, exposed to every surge of the sea, which had not subsided so rapidly as the wind, and which occasioned her to roll most awfully; and now, as she rose on the mountainous billow, every eye eagerly swept the horizon in search of the fleet, but all in vain, for not a ship could be seen; we therefore trembled for their fate. The bowsprit, fore-mast, mizen-mast, and main-top mast, as before intimated, were all gone by the board, the whole of the live stock, (with a trifling exception,) consisting of 150 sheep, 30 pigs, 4 cows, 3 calves, 8 goats, and many hundred head of poultry, were washed over-board, or otherwise destroyed; nearly all the captain's stores, the medicine chest, and the seamen's chests, with their contents, were in the same predicament. After an anxious scrutiny of the charts, no friendly port was found to be within reach of us; the

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nearest towards the east was Bencoolen, which, on account of the season of the year, was difficult of approach, and incapable of affording the relief we stood in need of. Towards the west was the Isle of France, then in possession of the French. To proceed direct to the Cape was an undertaking which, at the first blush of our situation, nobody conceived to be practicable. Still, upon a closer inspection of our resources, many difficulties were obviated, and our situation appeared to be far less desperate than we had at first imagined. Our stock of water and salt provisions, which was considerable, was happily found to be uninjured: we had rice and spirits in abundance. Our spare stock of spars, which was also considerable, and well secured before the storm commenced, was safe; we had spare sails, canvass, and cordage sufficient, and we knew our situation to be on the verge of the south-east trade-wind, which blew direct towards the Cape, and the season for entering Table Bay was favorable. After due deliberation at a meeting of the officers of the ship, and the principal passengers, it was unanimously resolved to undertake the voyage to the Cape; and, as an encouragement to the crew to give their spontaneous exertions in favor of this great undertaking, a subscription was immediately entered into, with a view to replace their chests, clothes, &c. which were lost in the storm. Seven hundred pounds were raised for this purpose in the course of a few minutes, (perhaps an unprecedented act of liberality,) which was no sooner communicated to the crew, than they gave three hearty cheers, and declared their readiness to perform every duty required of them; and never was a promise more strictly fulfilled: however, in spite of these but seldom paralleled exertions, we were eleven weeks in reaching the destined port, after suffering many privations. Still I consider this as one of the happiest periods of my life; and judging from the number of cheerful countenances, and the unanimity which reigned throughout the ship, I much doubt whether it were not the lot of every soul on board.

I cannot account for the fact, unless it was owing to the peculiar frame of mind which we had imbibed from our recent deliverance, —a frame of mind which philosophy would spurn at, but which religion might have hailed as the precursor of the only solid happiness destined for man.

The day of our arrival in Table Bay was one of intense excite-

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ment, anxious as we naturally were, to ascertain the fate of a fleet from which we had separated eleven weeks before under such unpropitious circumstances. This suspense, however, was of short duration; our worthy Commodore, with five of his convoy, were soon discovered to be safe at anchor in the Bay, the remaining three ships were missing, and, sad to tell, have never since been heard of. Of those which were safe, four, including the seventy-four gun-ship, had been in more or less danger of foundering in the storm, whilst two escaped without injury; owing, as it appeared from a comparison of Journals, to their having escaped the brunt of the storm by being considerably to windward of the others; thus corroborating, the theory with which I commenced, in my endeavours to prove that where the storm begins there will it soonest end; a great part of the third day, which was by far the most tempestuous with us, these two ships lay perfectly becalmed.

Such were the disastrous effects of this memorable hurricane, from a summary of which I think myself entitled to draw the following practical inference; namely, that had we instantly attended to the timely warning of the Barometer, by bringing the ship to the wind, and making preparations for the storm, instead of scudding before it, until we could scud no longer, we should have escaped with as little injury as the two ships I have just alluded to, and that had the three unfortunate ships which foundered in the storm pursued a similar course, which it may be fairly presumed they did not, a very different fate might have befallen them too.

But, lest the fatal catastrophe of this hurricane should not be deemed sufficiently conclusive, I shall mention the result of another, no less fatal in its consequences, which was encountered in the following season by another fleet of Indiamen, nearly in the same latitude and longitude, whilst under convoy of the late Lord Exmouth. On this occasion four of the finest ships of the fleet, crowded with passengers from Calcutta, were supposed to have foundered, as they were missing immediately after the storm, and were never heard of more. The last time they were seen was by Lord Exmouth himself, when they were observed to be scudding before the gale, whilst the rest of the fleet were lying-to.

Here, then, we have another melancholy instance in point, which, coupled with the preceding, ought to satisfy the mind of the most sceptical seaman, as to the infallibility of the Barometer in indicating the approach of hurricanes, within the tropics more particalarly,

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and consequently of the inestimable value of this instrument to every commander of a ship, and more especially to those whose destination is India.

I am, Sir, your obedient Servant.

MERCURIUS.

V.—MEMORANDUM ON THE TIDES AT MADRAS, *November* 1821.

By Lieut. Col. DeHavilland of the Madras Engineers.

The results of the observations made on the tides at Madras by the means of a *Tide Gauge* near the north east angle of the glacis of the Fort from the 31st May to the 10th October 1821 inclusive, were as follows. That high water on the full and change of the Moon, was at 8h 58 or 9h. That on those days the difference of elevation of the surface of the sea at high and low water, was 2 feet 7¾ inches; that on the 4th days of the Moon's age, and the corresponding days after the full, this difference was 3 feet 5½ inches the *maximum* and that the 2d days after the 1st and 3d quarters, it was reduced to 1 foot 7½ inches the minimum. It was also observed, that the daily decrease was *greatest*, on and immediately before the 1st and 3d quarters, and the increase *least*, immediately after. It was likewise remarked, that the average level of the sea at mid-tide, or between high and low water, *varied* with the Phases of the Moon. That it appeared *highest* on the 3d days of the Moon's age, and the corresponding days after the full, and *lowest* on the 2d days after the 1st and 3d quarters—and the difference was observed to be about 1 foot 4 inches; but it is probable that this being so great, was owing to some anomaly, in the observations made on the 3d days of the Moon's age, and those corresponding after the full, and that in point of fact, it was not more than 1 foot. The following table contains the particular of these results. The retardation of the tides from day to day was considerably less for the first four or five days after full, and change than at any other time; it was then about 30 per diem.

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Results of the observations made on the Tides at Madras from the 31st May to the 10th October 1821 by means of a *Tide Gauge* fixed near the north east angle of the Fort.

Phase and age of the moon.	Time of high water.		Surface of the water *below* the *gauge* mark. At high water.		At low water.		Medium level of the sea.		Difference between high and low water mark.	
	Ft.	Ins.	Ft.	Ins.	Ft.	Ins.	Ft.	Ins.	Ft.	Ins.
full and change	8	58	5	3¼	7	11	6	7⅛	2	7¾
2d and 16th	9	26	5	1½	8	1	6	7¼	2	11½
3rd and 17th	10	0	4	7½	7	8¾	6	2⅛	3	1¼
4th and 18th	10	30	4	9¾	8	3¼	6	6½	3	5¾
5th and 19th	11	0	4	10½	8	1¼	6	5⅞	3	2¾
6th and 20th	11	42	4	11¾	8	2	6	6⅞	3	2¼
7th and 21st	12	12	5	3½	7	11¾	6	7⅝	2	8¼
1st & 3d Qrts	12	30	5	4½	7	9½	6	7	2	5
9th and 23rd	1	21	6	1½	8	0	7	0¾	1	10½
10th and 24th	3	6	6	4½	8	0	7	2¼	1	7½
11th and 25th	4	45	6	6	8	3	7	4½	1	9
12th and 26th	5	24	6	7	8	5¼	7	6⅛	1	10¼
13th and 27th	6	25	6	4¾	8	4¾	7	4¾	2	0
14th and 28th	7	11	5	11	8	0½	6	11½	2	12
29th	7	37	5	8¼	8	0¼	6	10⅛	2	4
					8	1				
Average mean level of the sea in the whole period							6	10		

It is necessary to notice that until the 29th of July the observations were frequently interrupted, but that after that date they were made daily, at every tide, in every 24 hours; and as there appears some difference in the results obtained from the subsequent period, they are given in the following statement.

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Similar statement as the above from 29th July to 10th October 1821 both inclusive.

Phases and age of the moon.	Time of high water.		Surface of the water *below* the *gauge* mark. At high water.		At low water.		Medium level of the sea.		Difference between high and low water mark.	
	Ft.	Ins.	Ft.	Ins	Ft.	Ins.	Ft.	Ins.	Ft	Ins.
full and change	8	54	5	4½	8	4½	6	10⅜	2	11¼
2d and 16th	9	24	5	0½	8	4½	6	8¾	3	3¾
3rd and 17th	9	54	4	11¾	8	3	6	7⅜	3	3¼
4th and 18th	10	24	5	0⅛	8	2	6	7	3	1⅞
5th and 19th	11	0	4	10½	8	1	6	5¾	3	2½
6th and 20th	11	42	4	11¾	8	2	6	6⅞	3	2¼
7th and 21st	12	12	5	3½	7	11¾	6	7⅝	2	8¼
1st & 3d Qrts.	12	50	5	4½	7	9½	6	7	2	5
9th and 23rd	1	21	6	0⅛	8	0¾	7	0⅜	2	0⅝
10th and 24th	3	6	6	4½	8	1⅜	7	3	1	8⅞
11th and 25th	4	24	6	6	8	4	7	5	1	10
12th and 26th	5	24	6	7	8	5⅝	7	6¼	1	10⅝
13th and 27th	6	18	6	4	8	4⅜	7	4¼	2	0⅝
14th and 28th	6	48	5	10⅛	8	2¾	7	0⅜	2	4⅝
29th	7	37	5	5	8	1¼	6	9⅛	2	8¼
					8	2½				
Average mean level of the sea in the whole period							6	10¾		

Although this statement appears less anomalous than the last in some respects, it is not so in all, and as the other has the advantage of including the period of the long shore winds and strong southern currents, it is a better average for the whole season than the last.

Much variation appears in all the daily observations, as the rise of the sea is evidently affected by the winds and currents which both tend to *accumulate* the waters.

The present *Tide Gauge* it is feared will not answer for the ensuing season as the N. E. winds have filled up the angle it is fixed in with sand, in a great degree. If it should be replaced, it would be best situated at one of the projecting angles of the Fort bulwark.

The Gauge consists of an iron pipe syphon, having one horizontal branch, sunk, in the sand below low water-spring-tides mark; and one perpendicular branch with a float and rod in it; showing the rise and fall of the water. The length of the horizontal branch

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is about 70 feet and the end of it under the surf is fixed to cross timbers to prevent its sinking deep into the sand.—The water in the upright arm of the syphon is drawn every day to ascertain that it flows freely. As the pipe is doubtless in a great measure filled with sand, it follows that the water neither flows nor ebbs in the syphon to its *exact extremes*, and therefore, that the rise and fall given in the Tables must be considered rather *under* the truth.—In many instances, the difference of high and low water is as much as 4 feet 3 inches and even 4 feet 6 inches. The beating of the surf affected the water in the pipe and the rod oscillated up and down at each stroke, but this oscillation did not exceed *half* or *three* quarters of an inch in the highest surfs.

The variation of mean level of the surface of the sea noticed above (5th column) accounts for the rise of the water in the river at Madras during the dry season. The sea on intering at the Ennore Bar, when the Chepauk Bar is shut up, comes down the canal from thence; after the full and change, the water is observed to rise for two or three days, in about as many days more, falls again; while however the daily operation of the Tides is not perceptible, from the distance of the Ennore Bar. This rise and fall has at the Wallajah bridge been frequently observed to be as much as 8 or 10 inches.

It is possible that the sea water filtering below the sands may aid this operation a little, but not much; for the ditch of the Fort which is kept full by means of this filtering underneath the sea face counterscarpe, is scarcely affected by this rise of the sea above alluded to no more than by the flowing and ebbing of the Tides daily.

VI.—Translation from a work by, M. M. Botté et Riffault, detailing the method pursued in France, of extracting Saltpetre from the soil, and of ascertaining the quality of Saltpetre by Assay. Communicated by Lieutenant Colonel Napier.

As natural mines of Saltpetre exist in France, it has long been an object of primary importance with the Government to improve, and increase the manufacture of that article, by the employment of men of science to establish manufactories upon the best and most economical principles, by which means the produce of Saltpetre was doubled in four years.

A prize of 4,000 Livres, was offered by the Academie of Science,

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with the sanction of Government, for the best mode of producing artificial Saltpetre, and was of much use at the time in drawing attention to the subject, the result however of many attempts, though successful, ended in disappointment, as the process was so expensive as hardly to repay the out-lay, by the produce.

The source from which advantage was to be expected, was that of seeking for the natural mines of Saltpetre, either in the soil or in stones, and to collect it from caves, cellars, stables, or sheep farms.

In the year 1784 M. Riffault was specially deputed by Government, to instruct the several Saltpetre manufactories in the use of Potasse (one of the most important operations in the manufacture of Saltpetre) and to form new establishments in every Province where Saltpetre could be obtained, so that in a few years, the annual produce of pure Saltpetre delivered for the use of Government amounted to 1,900,000 of Kilogrammes, of which Touraine and the neighbouring country supplied $\frac{2}{20}$, the Nitrieres, or artificial $\frac{1}{20}$, Paris $\frac{7}{20}$ and the other departments the remaining half. This last portion ought necessarily to augment, *consequent* to the *increase* of *Territory.*

Tons about . 1872 sufficient to make more than 55,000 barrels of Gunpowder of 100lbs. each.

The following are the processes established in France for the manufacture of Saltpetre.

The first process is to reduce the material which contains the Saltpetre to such a powder, as that the water will penetrate every part, and dissolve the whole of the salt.

As in France Saltpetre is chiefly found in calcareous stones, they are broken in a mill, and sifted through sieves, or broken with beaters armed with iron and sifted.

A manufacturer of Saltpetre ought to be provided with an instrument called an Arèometre for nitre, to ascertain correctly the density of solutions. The Arèometre of the Administration of France is so graduated, as to shew, when plunged into a cold saline solution the quantity of salt contained in 100 parts of the solution: for instance, if the Aréometre* when put into a cold saline solution marks 15 degrees we may be assured that for every 100

* I think it necessary to mention here, that there are two descriptions of Aréometres for nitre used in France.—First. That of the Administration, which is sufficiently explained above, and is the one referred to in this work. — Secondly. That of Baumé which is graduated so as to indicate the quantity of salt extra to 100 parts of water, so that when it marks 15 degrees, there must be 15 parts salt in solution with 100 parts of water.

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parts of the solution by weight, 85 parts consist of water, and 15 parts of salt.

The material containing the Saltpetre having been brought to a fine powder, is to be placed in large wooden troughs having holes cut at intervals along one of their long sides, and closed with wooden pegs. Water is then to be sprinkled over the earth, till it overflows and remains above it about 1 decimitre (nearly 4 inches) and left till next morning, when the plugs are to be removed, and the water allowed to flow into a reservoir prepared for it.

Place the Aréometre in this solution and if it marks 15 degrees or upwards the solution may be set aside to be evaporated, if under 15 degrees, this water, together with that which results from the further washing of the first trough, is to be used in washing the earth in the second trough.

Although it is necessary in the first operation, that the water should remain upon the earth for about 10 hours, in the subsequent washings two hours will be sufficient, or the plugs may be removed altogether.

Water is to be sprinkled as before over the earth in the first trough, till that which flows from the apertures, marks only $\frac{3}{4}$ of a degree by the Aréometre, when the earth may be removed from the trough, and replaced with fresh earth, to be treated as before, or to receive the waters from the second trough, if found to be so feeble as to require it.

River or rain water ought to be used for these washings in preference to well water.

On the treatment of the Saltpetre water, by potasse—or by Sulphate of potasse, or by ashes.

Nitrate of potasse is never found alone but mixed with muriate of soda, earthy parts and frequently also by sulphates—from the result of much experience, we may consider the saltpetre materials as containing, about 10 per cent nitrate of potasse—70 per cent nitrous earth, 15 per cent muriate of soda, and 5 per cent of earthy muriates—so that taking 100 Kilogrammes of the water obtained from washing the saltpetre earth, which marks 15 degrees by the Aréometre (indicating that the solution contains 15 Kilogrammes of salts) there is only 12 Kilogrammes of nitrate of potasse—and earthy nitrates; or about $1\frac{1}{2}$ nitrate of potasse—and $10\frac{1}{2}$ earthy nitrates.

It is this latter portion of earthy nitrates which it is necessary to decompose and to convert into nitrate of potass.

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For this purpose the potass of commerce, or sulphate of potass, or simply ashes may be used.

The method of employing the potass, consists in dissolving it in double its weight of water, and in this state to mix it well with the saltpetre water—this gives place on the spot to a separation of the earthy bases from their combinations replaced by the potass, and produces a precipitate, which when the operation of agitating or stirring the solution ceases, deposits at the bottom of the pan.

The quantity of potass required to be used may as a general rule be estimated at one third of the number of degrees indicated by the Aréometre, as it is better to use too little than too much—thus for instance if the saltpetre water marks by the Aréometre 15 degrees; a vessel containing 400 Kilogrammes of this water will require 5 per cent or 20 Kilogrammes of potass, and so on according to the degree indicated by the Aréometre.

On the decomposition of the earthy nitrates, by the Sulphate of potasse, as practised at the Manufactory of Saltpetre at Montpellier, by M. Berard.

The Sulphate of potass which is frequently to be procured at a very small price results principally from the combustion of a mixture of Sulphur and Saltpetre, in the fabrication of Sulphuric acid, that which is obtained by other means is generally extremely pure and is sold to advantage to chemists &c.

Having procured a sufficient quantity of sulphate of Potass to fill several pans or troughs, it is to be broken or pounded, and thrown into pans with a mixture of wood ashes, heaped up above the surface of the pan, and left a short time till the acid is absorbed. Water is then to be sprinkled by little at a time over it, until the water overflows the surface, and allowed to rest for a few hours, when the cock near the bottom is to be opened, and the water allowed to flow from it into a reservoir.

This water will at first be discoloured and cloudy, but will in a short time become clear, and when tested by the Aréometre will mark about 20 degrees.

The matter contained in the pans will have fallen considerably, and ought to be filled up with fresh materials, and the washing with water continued as before, to obtain as much of the salt as possible. If the water flowing from the pans when tested by the Aréometre is found to be too feeble, it must be used to wash another pan, till it acquires a density of about 20 degrees.

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It only remains to fill a deep pan or boiler, three parts full with Saltpetre water, and to throw upon it one fifth $\frac{1}{5}$ by weight of the water obtained as abovementioned, the solution is then to be well mixed, and left to settle, when it is to be drawn off from the surface, leaving the sediment.

The expense of this operation is a very small matter, compared to the quantity of nitrate of potass recovered which would otherwise be lost—and the saltpetre will be obtained of a fine white colour.

On the decomposition of the earthly nitrates by means of ashes.

Troughs the same as are required to wash the saltpetre earth, or wine barrels with double bottoms pierced with small holes, may be used for this purpose.

A small quantity of long straw is to be placed between the two bottoms, and also over the false bottom, covered by a piece of coarse flannel or serge.

Having prepared fresh wood ashes, by passing them through a sieve to separate the charcoal, they are to be moistened with water very equally, so that when taken in the hand they may form in lumps, in this state they are to be spread over the flannel, in the first instance to the depth of six centimetres, (about 2¼ inches) and pressed down lightly at first, and afterwards more strongly by a flat beater, continue to add fresh layers of ashes pressed down as beforementioned, until the trough or cask, is about half full, the surface being levelled each time with a trowel. It is necessary to place over the trough in which the ashes are placed a hurdle, or basket with some straw in it, to prevent the loss of water.

All that is necessary then, is, to pass the *Saltpetre* water through the ashes, in the proportion of fifteen measures of water, for one of ashes. After which the ashes which remain may be mixed with fresh saltpetre earth, to disengage by washing any saltpetre remaining in them.

If the use of ashes does not altogether supercede the employment of potass, still they will assist, and diminish the quantity of alkali required to be used, according to the proportion of alkali, contained in the ashes.

To ascertain the quality of the ashes to be used, take about 25 lbs. of them, and wash with water, till no salt remains in the ashes; filter this water, and then evaporate it to dryness in an iron pan, taking care to remove the different salts which may precipitate, during the operation, and to constantly stir the salts at the time of desiccation, in order that they may not adhere to the bottom of the

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pan—the produce thus obtained will shew the quantity of alkaline matter, changed with a part colouring and extractive, and a portion of foreign salts.—If this produce is calcined in a crucible, the pure potass alone will remain.

Mode of conducting the evaporation.

To proceed with advantage in this operation, it is necessary, first. That the saltpetre water should be of sufficient strength to prevent the unnecessary expenditure of fuel—second. That the water should have been sufficiently treated with potass, to admit of the evaporation being continued to the extent required, without that swelling or over boiling which is hurtful—and lastly. That there should be a sufficient quantity of water collected, before the operation is commenced upon, not only to fill the boiler, but to fill it up, as the water evaporates, and by continuing this operation without ceasing to obtain by *one* process as much Saltpetre as possible.

In general it is advisable to stop the evaporation at the point when the nitrate of potass and the water are in equal parts as the operation can be better conducted, with less obstruction from the earthy salts, and other refuse more easily and exactly separated, than if pushed further.

Accordingly it is only by knowing the capacity of the boiler, that a calculation can be made. If for instance the water shews a density of 15 degrees by the Aréometre for nitre—which indicates that it contains 0.12 of nitre— and if the boiler contains 1200 Kilogrammes—then this quantity of saltpetre water, may be considered to consist of 1020 Kilogrammes of water, and 180 Kilogrammes of salts, or about 144 Kilogrammes nitrate of potass, and 36 of Muriates, in order therefore to bring the nitre and water to equal parts, 876 Kilogrammes of that salt must be added, this quantity of nitre is represented by 7,300 Kilogrammes of saltpetre water at 15 degrees, or 12 per cent.

Accordingly it is this quantity of 7,300 Kilogrammes equivalent to 68 hectolitres (about 1,743 English gallons) with which it is necessary to fill up the evaporating boiler; when all this additional water has been evaporated the operation may be brought to a conclusion.

Having collected a sufficient quantity of saltpetre water to carry through one operation, the boiler is to be filled, and brought to boil, and replenished gradually as the water evaporates, this is best done by placing a pan, kept constantly full of this water, near the surface of the boiler and by means of a stop cock, to let off the water gradu-

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ally as required, so that the boiling may not be checked by a large addition of water at any time—this pan may be heated by a flue from the furnace, by which means a considerable expenditure of fuel will be saved.

As a considerable quantity of earthy matter &c. will soon begin to fall to the bottom of the boiler, and form a hand cake, which is very injurious to the metal, a small pan ought to be placed in the centre of the solution, raised two inches from the bottom of the boiler, in which this earthy matter will collect, this pan is to be suspended by means of iron chains, connected by a rope to a pulley above, so that it can be raised up from time to time, and its contents emptied into a box or basket placed at the edge of the boiler, to allow the water to drain back. It is essential that the solution should boil at an equal steady temperature, increasing or diminishing the fire as may be necessary, and the skum ought to be carefully and frequently removed.

When all the extra water has been added, the pan is to be withdrawn from the bottom of the boiler—The common salt will then begin to fall, and must be removed with a scoop ladle from the bottom, and placed, in a basket as beforementioned to drain.

It is proper at this period to decrease the fire which delays the operation, but the results are thereby obtained with more regularity. When the common salt falls to the bottom in abundance, the solution is approaching the proper degree of concentration, which may be easily ascertained by taking out a small portion of the liquid and placing it in a vessel to crystallize. &c.

When it is judged proper to stop the operation the fire is to be decreased, and the solution left to repose, till the common salt ceases to fall, or about five hours, during which time the solution ought to be kept steadily at the temperature of about 88 Centigrade thermometer or 190 of Farenhiet when it may be drawn off from the surface into crystallizing pans, taking every care to leave undisturbed, the salt or sediment at the bottom. It will require three days to complete the crystallization in winter, and longer in summer, and during hot weather fewer crystals will be obtained.

The mother water is then to be removed from the pans, and they are to be put up to drain, two and two, inclining towards each other in a channel.

In the manufactories of the Administration the crystallization is determined, by a much more easy and expeditious operation, the water is run off, into a long and large reservoir, lined with sheet lead or copper, the interior dimensions of which is about 12 feet

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long, by 7 feet broad at the surface, the bottom is formed with a double slope of four inches towards the centre, one from the sides, the other longitudinally, so that the depth at one end is 16 inches and at the other end 20 inches.

The water is kept constantly in motion by means of wooden rakes to assist in cooling it, and the crystals as they form are raked to one end of the reservoir heaping them up to drain, and removing the most elevated parts, as they whiten perceptibly, to be carried to troughs or baskets and left to drain. In thus removing successively the small crystals as they form, the agitation, of the water with rakes must be continued incessantly to prevent the Saltpetre from forming in large cakes.—When the water has fallen in temperature to within 4 degrees of the place, or in about six hours all the Saltpetre will have been obtained, and the water will remain collected in the centre and towards one end of the reservoir from whence it is easily removed.

On the treatment of the water of crystallization.

This water will be left fully saturated with nitre and common salt, with a portion of earthy nitrates which may not be decomposed and ought to be again treated with a small proportion of potass, or passed over ashes, and then evaporated—or this water may be mixed with other Saltpetre water, before the latter has been treated with potass. If it is evaporated separately, the water which again remains may be abandoned or sold.

In France the earthy substances removed from the bottom of the boiler, is washed to recover the nitre remaining in it, the skum is boiled up in good water for the same purpose, and the refuse salt, *which* also contains a considerable proportion of Saltpetre is treated as follows.

* A boiler is to be filled three parts full of water and brought to boil; pure common salt is then thrown in till the water is fully saturated, which will be known by some of the salt falling to the bottom, the excess is removed with a scoop. Have in readiness some baskets filled with the refuse salt, one of these baskets, is to be immerged in the *boiling solution*, which cannot dissolve any more common salt, and can only act upon the nitre contained in it, in a short time, this basket may be withdrawn, and another put in, and so on till the water in the boiler is fully saturated with nitrate of potass, when it may be drawn off to crystallize. The baskets are put into the boiler by means of ropes, and a pulley fixed to a Crane.

* I have made trial of this system of treating the refuse salt, and I find that it will amply re-pay the cost, by the quantity of Saltpetre recovered.

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VII.—*Assay of Saltpetre according to the principle established by M. M. Botté et Riffault in France.*

This process consists in using a dissoluent of salts of earthy bases and of muriate of Soda which at the same time will not act upon the nitrate of potasse, and in leaving it undisturbed would shew the exact quantity of pure nitre contained in any given quantity of grough Saltpetre; this dissoluent is water fully saturated with pure nitre; if care is taken to obtain the saturated solution at the time of using it, in a fully saturated state.

The following is the method to be pursued.

Method of preparing the saturated solution.

Take about two or three pounds of pure nitre pounded and sifted, and throw it by degrees into a copper vessel tinned inside about 12 inches deep, and 5 inches diameter pouring in at the same time, good water heated to 126 degrees of Fahrenhiet, to be well stirred, and left for three or four hours or during the night, there ought always to be a portion of pure nitre not dissolved at the bottom, and the solution ought *never to be used* without stirring it well up from the bottom, and allowing it only one minute to settle, each time of using it.*

The Saltpetre received is to be collected in a heap, and well mixed, and a quantity taken from different parts of the mass, from which a sample; or any number of samples of 100 drams avoirdupois each is to be taken, the saltpetre taken for assay must be well bruised in a mortar.

One of these samples of 100 drams is to be placed in a glass vessel (a common finger glass or cooler is well adapted for this operation) and half a pint of the saturated solution poured upon it, and constantly stirred with a glass rod for 15 minutes, then allow it to settle for an instant, and pour off the surface water into a paper filter placed in a funnel over any vessel, this paper filter is necessary in order to retain any nitrate of potasse which may escape by carelessness in pouring off the surface water.

The Saltpetre in the glass vessel is then to be washed a second time with a quarter of a pint of the saturated solution, and stirred with a glass rod constantly for 15 minutes, allowed to settle and

* In France where this mode of assay is pursued, an instrument called an Aréometre, with a thermometer are used to ascertain, that the solution is fully saturated up to the temperature of the place before using it, but the assay may be conducted with great accuracy without these instruments if the rules here laid down are strictly observed.

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the surface water poured off as before, draining off the water to the utmost, with care and attention, in pressing the nitre remaining in the vessel with a tea spoon.

The nitre remaining in the glass vessel is then to be spread upon a treble fold of filtering paper placed upon a box containing chalk or ashes or any absorbent matter, carefully removing every particle of nitre from the glass vessel; the box is to be placed in a dry place for 24 hours, the time necessary for the paper &c. to imbibe great part of the moisture—the nitre must then be carefully removed from the paper with a spoon and a knife or spatula and placed in the same glass vessel in which it was washed to be placed on a bed of sand over a gentle fire, and the salt constantly stirred with a glass rod, till the salt no longer adheres to the rod or to the vessel, when it will have fallen to a fine dry powder.

It only remains to ascertain the exact loss in quantity by weighing the nitre recovered, and to the number of drams found wanting, add one per cent for insoluble matter, such as sand or earth, and the amount will be the quantity of impurity contained in the sample of 100 drams, and of course in the whole mass of grough saltpetre received of which it was a part.

Should the result of the assay shew a loss of weight of 60 per cent. it will be necessary to wash the sample a third time with half a pint of the saturated solution, which would be more than sufficient to dissolve the whole that remains of the sample should it prove to be altogether nothing but common salt.

Thus if 100 drams of saltpetre is taken for assay the following form may be observed.

	Drams.
Taken for assay, saltpetre.................	100
Recovered after washing and drying........	79
Impurities..........	21
* Add one per cent. for insoluble matter such as gravel, sand, &c..	1
Total impurity.......	22

Quality of the sample 78 per cent. purity.

* The quantity of insoluble matter remaining in the sample, after the assay has been completed will seldom exceed one per cent, but if necessary it can be ascertained by dissolving what remains of the sample in boiling water and passing the solution through filtering paper, the insoluble matter will remain upon the paper, and can easily be collected, dried and weighed.

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VIII.—*At a General Meeting of the Madras Literary Society and Auxiliary of the Royal Asiatic Society, held at the College on Thursday the 30th January* 1834.

Present.

The Honorable Sir R. PALMER, *President in the Chair.*

The Hon. W. OLIVER, ESQ.
Revd. Mr. SPRING,
Captain ROWLANDSON.
Æ. R. McDONELL, ESQ.
W. LAVIE, ESQ.
R. COLE, ESQ.
Lieut. Col. NAPIER,
Dr. BENZA,
Major HODGES,
J. A. R. STEVENSON, ESQ. and
J. C. MORRIS, ESQ. *Secretary.*

The Meeting having been opened by the Honorable the President, the Secretary laid before them a statement of the Funds of the Society in both its branches.

The meeting then proceeded to elect new members for the Committee of Management, and for the Committee of Papers, of the Asiatic Department for the ensuing year.

On the proposition of the Honorable the President, seconded by the Honorable Mr. Oliver, the following gentlemen, were unanimously elected members for the Committee of Management.

Lieut. Col. Garrard,
J. Annesley, Esq.
Revd. Mr. Spring,

Proposed by the Honorable the President, and seconded by Lieut. Col. Napier, that the following gentlemen be requested to become members of the Committee of Papers.

Dr. Benza,
J. G. Malcolmson, Esq.
H. S. Fleming, Esq. M. D.
R. Cole, Esq.

On the proposition of the Secretary, the thanks of the meeting were unanimously voted to Dr. Benza, and Lieut. Col. Cullen, for their valuable services in classing, arranging, and naming the large collection of mineral and geological specimens, in the Society's museum.

The following donations having been made to the Society, since the last annual general meeting, the thanks of the Society were unanimously voted to the donors.

Notitia Linguæ Sinicæ............. Lieut. Newbold,

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A Chinese classical work commonly called the four books............	Lieut. Newbold
The Anglo Chinese Kalendar for 1833	Do.
Report of the Malacca Mission station and Anglo Chinese College......	Do.
Frith's Questions and Answers on the duties of Artillery..............	The Author.
Braddock's Memoir on Gunpowder..	The Author.
A case of meniral and geological specimens, collected in the Palnaud District Guntoor Collectorate....	Capt. D. Montgomerie,
A Neptune's Cup from the straights of Malacca......................	Do.
The 18th Vol, of the Asiatic Researches.	The A. Society of Bengal,

The following gentlemen have been elected members since the last general meeting,

T. M. Lane, Esq.
Captain C. B. Lindsay,
W. E. Underwood, Esq.
W. Elliot, Esq.
W. H. Richards, Esq.
Colonel Pearse,
Lt. Col. Frith,
Lieut. Col. Monteith,
R. Cole, Esq.
J. Ouchterlony, Esq.
F. Hall, Esq.
A. Rowlandson, Esq.
Captain Boileau,
Lieut: Garnier,
Major Hodges,
W. Lavie, Esq.
J. G. S. Bruere, Esq.
J. G. Malcolmson, Esq.

Lieut. A. Burnes, Honorary Member.

The following gentlemen have died or retired since the last general meeting.

Lieut. Col. Coombs,
S. M. Stephenson, Esq.
C. M. Whish, Esq.
J. Irving, Esq. M. D.
Captain E. Lake,
T. Gahagan, Esq.
W. T Newlyn Esq.
S. Crawford, Esq retired.
Capt. D. Montgomerie, retired.

Rear Admiral Sir H. Black-wood, K. C. B.

Read letter from the Secretary to the Geological Society of France, forwarding the laws of their association and requesting to know if the Society would agree to enter into correspondence with them and accept their Transactions in exchange for those of the Society.

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Resolved that the proposition of the Geological Society of France, be acceded to and that copies of the Society's Transactions and of the Journal of Literature and Science published under the auspices of the Society, be presented to the Geological Society of France, and to the other Foreign Societies, who have forwarded their Transactions to the Society.

The thanks of the Meeting were voted to the Honorable the chairman, for his able conduct in the chair.

IX.—At a Meeting of the Madras Literary Society and Auxiliary of the Royal Asiatie Society, held at the Society's Rooms, at the College, on Thursday evening the 27th February, 1834.

Present.

The Honorable Sir Ralph Palmer, *President in the Chair.*

Revd. Mr. Spring,	Lieut. Col. Monteith,
Lieut. Col. Napier,	Lieut. Col. Garrard,
J. Ouchterlony, Esq.	J. Annesley, Esq.
J. G. Malcolmson, Esq.	C. V. Lutchmiah, and
R. Cole, Esq.	J. C. Morris, Esq. *Secretary.*

The Secretary lays before the meeting a Rustic Model of a Machine for raising water, a coloured sketch shewing the manner in which the principles of the Machine may with facility be reduced to practice, also a guide sketch, with references to the several parts of the mechanism, and an interesting paper on the different methods of raising water in India, presented to the Society by a scientific officer residing at the Presidency. The paper in question having been selected for the evening's perusal was accordingly read by the Secretary, and highly approved of by the meeting, and it is

Resolved that the same be laid a side for publication in the next No. of the Madras Journal of Literature and Science, and that the thanks of the Society be communicated to the donor.

The following books have been presented to the Society since the last annual general meeting.

Asiatic Researches, 17th Vol. Asiatic Society of Bengal.
Prinsep's Memoirs of Ameer Khan ....J. Prinsep Esq.
Travels of Macarius 3d and 4th parts......Royal Asiatic Society.

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Transactions of the Royal Asiatic Society Vol. 3d part 2d........................Royal Asiatic Society.
Shea's Translation of Mirkhond's History of the Early Kings of Persia....................Do.
Tohfut-ul-Mujahideen, by Lieut. M. J. Rowlandson...... ....Do.
Atkinson's Customs and Manners of the Women of Persia............ ....Do.
Appendix aux Rudimens de la Langue Hindoostani, par M. De Tassy...................The Author.

Resolved that the thanks of the Society be communicated to the several donors.

The thanks of the meeting were voted to the Honorable the Chairman for his able conduct in the chair.

We have much pleasure in giving insertion to the following letter, and list of Books, not only to record the munificent donation to the Madras Medical Society, but also to give notice of the liberality of that Society in extending the benefits thereof to the Members of the Madras Literary Society. Ed.

To

The Editor of the Madras Journal of Literature and Science.

Sir,

I am directed by the committee of management of the Madras Medical Society to transmit to you the accompanying list of Books, which were presented to the Library of that Institution by Dr. Conwell, with their request, that you will be kind enough to publish it in your next journal; and as some of the scientific works are scarce, to notify, that the perusal of any of them may be obtained by the Members of the Madras Literary Society, on the application of their Secretary.

I have the honor to be
Sir,
Your very obedient Servant
W. R. SMYTH,
Secretary Medical Society.

Madras,
3d March, 1834.

LIST OF BOOKS

Presented to the Madras Medical Society by Dr. Conwell.

Abernethy's Surgical works, 8vo. bd. 2 Vols. New Edition 1822.
Adams on Morbid poisons, with coloured engravings, bound, 1 2d Edition 1807.
Annesley's Diseases of India, with co-

loured plates, folio ½ bd. 2. 1823.
Arnold on Insanity, 8vo. bd. 2. 2d Edition 1806.
Ayre on Marasurus, bd. in rough calf 1. 1818.
Baume's Traité de la Premiere dentition, bd. 1. 1806.
Bayle Recherches sur la Phthisie pulmonaire 1. 1810.
Begin Principes de Physiologie Pathologique, bd. 1. 1824.
Berard doctrine des rapports du physique et du moral ½ bd. 1. 1823.
Berzelius L'emploi du Chalumeau, with plates 1. 1821.
Bichat Recherches Physiologiques Sur la vie et la mort, augmentés de notes par F. Magendie ½ bd. 1. 1822.
Boisseau Pyretologie Physiologique, bd. 1 vol. 1823.
Bowen on Cataract bd. in calf 1. 1824.
Broussai's Ecamen des doctrines Medicales, et des systemes de nosologie vols. 2. 1821.
——— Histoire des Phlegmasies, ou inflammations chroniques, 3 vol. 3d Edition 1822.
Buffon's histoire naturele des oiseaux bound in parchment, royal folio with beautifully coloured plates, a rare and magnificent work 11 vol. 1784.
——— ——— naturele Generale, nouvelle Edition with plates ½ bound in 127 vols. (vol. 36th wanting) 126.
Bedingfield's Medical Practice vol. 1 1816.
Calepini diction: octo-linguæ 2 vol. A. D. 1647.
Capuron nova Medicinæ elementa, ½ bd. 1. 1813
Ceylon Calendar for 1820 bd. 1. 1820.
Chevreul Recherches chemiques sur les corps gras 1. 1823.
Clarke on Children, and Pemberton on the Abdominal viscera ½ bd. 1. 1815.
Conwell's Medical Researches 1 1829.
Cliet observations medical Chirurgicales, bd. 1. 1823.
Cadogan on the Gout ½ bd. 1. vol. 5th Edition 1771.
Coleman on Respiration, bd. 1. 1802.
Cooke on Palsy—Abernethy on Hunter's theory of life, and Pharmacopia, ½ bound 1. 1821.
Corvisart maladies du cœur, bound 1. 1818.
Crowther on the Joints bound in rough calf 1. vol. 1808.
Cullen's Materia Medica ½ bd. 2. 1789.
Couper's Speculations ½ bound 1. 2d Edition 1797.
Curry on Death, vol. 1. 1815.
Cuvier Recherches sur les ossemens Fossiles, folio with plates, 5 vols. ½ bound 6 1821.
— Brogniart et Lamarck descript. Geologique des enviions de Paris, bound, fine plates, quarto vol. 1 and 8.
——— Anatomie comparé, with plates, bound vols. 5 A. N. 8.
Delabarre-partie mecanique des Denteste with engravings, bd. 1. 1820.
——— seconde dentition, with engravings, vol. 1. 1819.
Demours (A. P.) Traité des maladies des yeaux, 3 vols. 8vo. 4th vol. to 9. with coloured plates 4 vols. 1818.
Desault œuvres chirurgiales, bd. 3. 1813.
Desfontaines Flora atlantica, with fine plates ½ bound 2 vols. Anno sexto reipublicæ gallicœ.
De theis Glossaire de botanique bd. 1. vol. 1810.
Dublin Pharmacopia ½ bd. 1. 1828.
Dutrochet structure des animaux, and moulin de l'apoplexie 1. 1828.
Dictionaire Abridge des Sciences medicales, bound 10 vols. 1821.
Edinburgh Medical and Surgical Journal ½ bd. 16 vol. 2d Edition 1805.
——— ——— practice ½ bd. 1. 1816.
Falret-suicide Hypocondrie 1. 1822.
Fourcry's Chemistry bd. 11. 1804.
Guthrie on the Operative Surgery of the Eye 1. 1823.
Gasparin des maladies contagienses, bd. 1 vol. 1831.
Georget Physiologie du systeme nerveaux, bd. 2 vol. 1821.
Geoffroy St. Hillaire Philosophie Anatomique des organes respirationes 1 vol. 1818.
Goodland's Absorbent System bd. 1. 1814.
Gregory's Conspectus 2 vol. 1790.
Griffiths on Hepatitis, bound in rough calf 3. 1816.
Guthrie's Artificial Pupil, with engravings ½ bd. 1 vol. 1819.
Hall on the Digestive organs, bd. in rough calf 1 vol. 1820.
Hall's Essay on Diaguons. Philip on Indigestion. and Willis on Mental Derangement ½ bound in 1. 1822.
Hare on the Stomach, bound in rough

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calf 1 vol. 2d Edition 1824.
Hastings on Inflammation of the Lungs, and Engmy and Scudamore on the blood, ½ bound in one 1820.
Hany Troité de Mineralogie, ½ bound 5 vol. 1822.
——— ——— with atlas 1. 1823.
Heberdene's Commentaries bound 1. 2d Edition 1803.
Hippocrates Opera Omnia a Foessii folio bound 2d Edition 1657 Genera.
Histoire des Animaux sans Vertebres par Lamarck, bd. 7 vol. 1815.
Home on Ulcers 1. 1797.
Hamilton on Purgatives, ½ bd. 1. 6th Edition 1818.
Haller's Physiology, bd. 2. 1754.
Howslip on the Bowels, ½ bd. 1. 1820.
Johnson's Dictionary of the English Language, 5th Edition bound with gilt edges, 2 vol. folio.
Johnson on the Liver, bound in rough calf 1 vol. 3d Edition 1820.
Jones on Hœmorrhage with plates, and Ellis on Atmospheric air, ½ bd. 1. 1810.
Jameson on the changes of the human body, ½ bd. 1. 1811.
Jordan Code Pharmaceutique ½ bd. 1. 1821.
Journal of Science and the Arts, edn. at the Institution Brillan (16 Vols. bound in rough calf and 6 Vols. ½ bound) 22. 1816.
James on Inflammation, bound in rough calf 1. 1821.
Lanthois Theorie nouvelle de la Phthisie pulmon. 1 vol. 2d Edition 1818.
Le Normand l' art du distillateur ½ bd. 2 vol. 1817.
London Medical Repository, 4. 1814.
Maladies Contagiueses des betes a Laine, 1. 1821.
Medical and Physical Journal vols. 9 from March 1799 till June 1803.
Medico Chirurgical Transactions 11. 3d Edition 1815.
M'Lean on Pestilential Diseases, bd. in rough calf 2. 1817.
Memoir sur les chinois, 4to. bd. 15. 1776.
Moreau de Jonnes Histoire Physique des Antelles Francaises 1. 1822.
Morgan's Philosophy, ½ bd. 1. 1819.
Monro on Diseases, bd. 2. 1780.
Paris' Medical Chemistry, ½ bd. 1. 1825.
Parry on the Arteries, bound in rough calf 1. 1819.
——— ——— Tetanus and Hydrophobia 1. 1814.
Park's Pathology of fever, bound in rough calf 1. 1822.
Persoon traité des champignous conestibles, with coloured plates 1. 1819.
Philosophical Transactions abroad ½ bound 4to. 18.
Phillip on Hæmorrhage 1. 4th Edition 1820.
Picture on the present state of Physicians ½ bound 1817.
Pinel Nosographic Philosophique 3. 6th Edition 1818.
Playfair's Works, ½ bd. 4. 1822.
Police Judiciaire Pharmaco-chimique par Remer, ½ bd. 1. 1816.
Park's Chemical Catechism ½ bound 1 vol. 10th Edition 1822.
Prichard on Diseases of the Nervous system, ½ bound 1 1822.
Repertory of arts, 1st series 16 vols. and Index, 2d series, 35 vols. and Index, (7, 6 and 28 vol. wanting) with plates ½ bound 30.
Richer and Nouveaux Elements de Physiologie, ½ bound 2 1820.
——— Nosographic de therepeutiques chirurgicales 4 Cinquiemie Edition 1821.
Roland's Inductions Physiologiques, and Huzard nosographic veternairie (in 1 vol.) Printed in 1820 and 1822.
Raymond traité des maladies quii est dangereaux de Guerii 1 Nouvelle Edition 1816.
Orfila lecons de medecine Legale 1. 1821.
——— ——— ——— 2. 1823.
——— Toxicologie Generale 2. 1818.
Scudamore on the Blood, and Searle on Cholera 1. 1824.
Scarpa on the Eye with plates, bound 1. 1806.
——— Anatomicæ disquisitiones de auditu et olfactu, with plates, folio ½ 1. Milan, 1794.
Stokes on the Stethoscope, ½ bound 1. 1825.
Spallanzani on the Blood, bound 1. 1801.
Syder's Surgical Lectures, bound in rough calf 1. 1821.
Saunders on the Liver, bound in rough calf 1. 1809.
Stewarts Philosophy of the human mind ½ bound. 26th Edition 1818.
Sabtier medicine operative ½ bound 3 Tome Premier 1822.
Thomas on the Digestive organs, bd. in rough calf 1820.
Travers on Diseases of the Eye with coloured engravings ½ bound 1 1820.

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Trotter's Views and Waddington on Man 1. 1807.

Thillaye bandages et apparatus with plates ½ bd. 1 Troisieme Edition 1815.

Thenard traits de Chemie ½ bd. 1 vol. Tome Premier 1821.

Theses ½ bound 1. 1802.

The Ancient History of Ireland by Hanmer, Campion and Spencer 1. 1633.

Tiedemann et Jourdon Anatomie du curveau 1. 1823.

Valli on Animal Electricity bd. 1. 1793.

Vetch on Diseases of the Eye with coloured Engravings ½ bd. 1. 1820.

Vital Matiere Medicale ½ bd. 1. 1803.

Virey de la Puissance Vitale bd. 1. 1823.

Ware's History of the writers of Ireland folio bd. 1, 1764.

——— ——— Bishops of do. do. 1.

Wakefield's Ireland, quarto, neatly ½ bd. 2. 1812.

Watt on Chincough ½ bd. 1. 1813.

——— ——— Diabetes 1, 1808.

Wardrope on the Eye with coloured engravings ½ bd. 1. 1818.

Wade's select evidence 1. 1791.

Wallace on Chlorine 1. 1822.

Wright on Deafness 1. 1817.

Wilson on Febrile Diseases 4 Vol. 2d Edition 1808.

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X.—METEOROLOGICAL REGISTER KEPT AT THE MADRAS

	Standard Barometer No. 3 by Gilbert.							Standard Therm. by Troughtc						
	Sun Rise.	10 A. M.	App. Noon.	2 P. M.	Sun Set.	8 P. M.	10 P. M.	S. Rise.	10 A. M.	Aft. Noon.	2 P. M.	S. Set.	8 P. M.	10 P. M.
	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	°	°	°	°	°	°	°
1	30,130	-- —	30,148	30,130	30,128	30,140		75,0	---	81,8	81,7	79,9	79,6	
2	,130	30,150	,134	,124	,110	,110	30,110	74,5	79,8	81,4	82,0	79,0	78,3	78,[illegible]
3	,108	,114	,104	,100	,042	,054	,062	72,0	79,9	81,8	81,9	79,3	79,0	78,[illegible]
4	,042	,088	—	,044	,03[illegible]	,050	,056	74,0	80,0	---	83,0	80,0	79,0	79,[illegible]
5	,044	,066	,052	,038	,04[illegible]	,050	,054	78,0	82,0	83,8	84,0	81,1	80,6	79,[illegible]
6	,042	,076	,060	,036	,034	,046	,056	79,0	82,7	84,0	84,9	82,8	81,2	81,[illegible]
7	,022	,132	,120	,038	,034	,050	,070	77,5	83,0	85,0	83,5	81,5	80,9	81,[illegible]
8	,044	,148	,134	,100	,043	,064	,096	79,0	83,0	84,0	84,1	81,0	80,4	80,[illegible]
9	,076	,140	,116	,046	,050	,068	,082	74,0	81,0	82,8	82,7	80,7	79,9	79,1
10	,064	,114	,090	,050	,058	,072	,074	73,6	81,0	82,2	82,8	80,0	76,8	74,8
11	,048	,082	,052	,026	,034	,050	,050	72,2	79,7	81,6	82,3	79,5	78,3	74,0
12	,038	,096	,076	,032	,028	,037	,086	73,0	80,7	82,8	82,7	80,3	77,2	78,6
13	,018	,050	,026	,010	,008	,022	,028	73,0	80,0	80,1	76,9	76,0	77,0	77,9
14	,016	,066	,036	,016	,016	,038	,042	72,3	80,6	81,7	81,0	80,0	79,1	79,0
15	,022	—	,032	,006	,010	,034		78,0	---	82,8	82,0	80,0	80,0	
16	,022	,062	,040	,010	,020	,040		78,7	81,3	80,0	81,9	80,5	78,8	
17	,028	,072	,040	,016	,012	,044		76,3	77,2	80,0	82,4	79,9	79,5	
18	,042	,086	,056	,034	,028	,052	,064	74,9	80,1	82,4	83,0	81,3	80,0	80,[illegible]
19	,034	,092	,068	,034	,036	,056		76,3	82,0	83,0	83,4	81,0	80,1	
20	,036	,086	,068	,036	,022	,044	,044	80,0	82,0	83,4	83,1	81,5	80,7	80,[illegible]
21	,036	,092	,066	,028	,030	,058	,084	77,8	81,4	82,4	82,7	81,3	80,8	80,[illegible]
22	,050	——	,110	,060	,068	,122	,150	79,2	— -	84,0	84,1	81,0	80,5	80,[illegible]
23	,076	,184	,166	,128	,112	,142	,150	76,9	82,0	82,4	83,0	80,0	79,5	79,[illegible]
24	,122	,170	,150	,104	,036	,074	,072	75,9	81,7	82,2	83,3	80,0	78,3	76,[illegible]
25	,046	,100	,078	,040	,020	,046	,054	73,5	79,7	82,[illegible]	83,7	80,8	78,9	76,[illegible]
26	,040	,102	,074	,054	,020	,096	,102	76,7	81,0	82,8	83,8	82,0	79,5	77,[illegible]
27	,076	,172	,140	,124	,117	,126	,135	72,4	81,3	82,0	82,0	80,6	79,[illegible]	79,[illegible]
28	,114	,156	,132	,112	,038	,110	,120	77,9	81,[illegible]	81,5	82,0	79,7	78,[illegible]	78,[illegible]
29	,068	—	,136	,104	,108	,126	,138	77,0	---	82,0	81,8	79,5	78,7	78,[illegible]
30	,112	,178	,142	,114	,106	,114	,128	74,9	80,[illegible]	80,3	82,0	78,1	78,[illegible]	[illegible]
31	,116	,164	,146	,120	,120	,138		72,0	79,[illegible]	80,5	80,4	77,4	77,0	
Mean	30,060	30,113	30,093	30,059	30,052	30,073	30,082	78,7	80,9	82,2	82,6	80,2	79,2	[illegible]

OBSERVATORY; FOR THE MONTH OF DECEMBER 1833.

	Dep. of wet bulb Thermometer.							Rain.		Evaporation.	Wind.	Remarks.
	S. Rise.	10 A. M.	App. N.	2 P. M.	S. Set.	8 P. M.	10 P. M.	S. R.	S. S.			
	°	°	°	°	°	°	°	Ins.	Ins.	Ins.		
1	3,3		7,9	8,7	8,2	7,7					N. NE.	Cloudy.
2	4,5	6,4	9,3	7,4	7,3	7,4	7,0				Do.	Day clear, cl. at [night.
3	3,8	7,5	9,0	8,1	7,9	5,9	5,5				N. NW. NE. E.	
4	2,2	4,5		7,1	4,7	3,4	3,3	,007		2,003	N. NE. E.	
5	2,9	4,7	5,6	7,0	5,1	4,4	2,8				NW. E. NE.	
6	3,8	5,6	6,0	7,2	5,8	4,7	4,4				NW. NE. E. SE.	
7	2,7	5,8	6,8	6,7	5,7	5,5	5,0				N. NE. E.	Generally clear.
8	4,3	6,3	6,9	7,3	5,8	5,6	6,2				SW. NW. NE.	
9	2,7	7,1	8,8	9,3	7,9	7,9	7,3				N W. N E. E.	
10	3,7	9,1	10,2	10,0	8,2	5,5	3,8				N. SE. NE.	
11	3,5	8,0	11,4	12,4	8,8	8,6	5,3			1,750	SW. NW. E. NE.	
12	5,5	9,0	10,7	9,7	8,5	6,0	6,8				N. SE. E. NE.	Cloudy at night.
13	3,0	6,6	7,2	3,4	3,9	5,1	3,3		,201		W. N. NE. SE.	Cloudy through- [out.
14	1,8	6,4	6,7	5,6	5,8	5,0	5,0				NW. E. NE.	Clear.
15	4,2		6,9	6,7	4,5	3,8					Do.	Cloudy, heavy rain [at night.
16	3,7	4,6	5,1	6,0	4,4	3,9		,865			NE. E. SE.	Do.
17	3,3	3,0	4,8	4,7	3,9	3,8		1,595	,069		NE. E.	Do.
18	3,2	4,4	5,5	6,0	5,5	4,7	4,5	,528		1,501	NW. NE.	Clear throughout.
19	2,3	5,5	6,3	7,0	5,7	4,7					SW. E. NE.	Mostly cloudy.
20	4,7	4,8	5,8	5,9	5,2	4,2	5,2				E. NE. SE.	Do.
21	2,6	4,7	5,4	5,8	4,6	4,3	4,2				N. NE. E.	Do.
22	4,2		7,7	7,1	5,1	5,5	5,3				NW. E. NE.	Do. clear night.
23	4,1	7,0	7,3	8,8	7,0	6,8	5,3				N. NE. E.	Scattered clouds.
24	4,0	7,6	7,7		5,3	5,3	4,0				NW. E. NE.	Clear throughout.
25	3,5	5,9	7,7	5,7	4,8	5,8	3,7			2,987	NW. N. NE. E.	Do.
26	3,9	6,0	8,1	9,6	5,0	5,9	4,6				W. S. SW. SE. NE	Do.
27	2,0	8,0	9,0	8,2	8,1	7,3	7,5				NW. NE.	Scattered clouds.
28	7,5	9,0	8,6	9,2	7,8	7,8	7,3				E. NE.	Do.
29	5,7		9,3	10,0	8,3	8,4	8,0				N. NE.	Clear throughout.
30	6,9	11,7	10,6	12,3	9,2		10,4				N. E. NE.	Do.
31	5,5	10,6	11,5	11,6	10,9	9,7					NW. NE. E. N.	Mostly cloudy.
Mean	3,8	6,7	7,8	7,8	6,4	5,8	5,4					

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METEOROLOGICAL REGISTER kept at the MADRAS

	Standard Barometer No 3. by Gilbert.							Standard Therm. by Troughton						
	Sun Rise.	10 A. M.	Dep. Noon.	2 P. M.	Sun Set.	8 P. M.	10 P. M.	Sun Rise.	10 A. M.	Aft. Noon.	2 P. M.	Sun Set.	8 P. M.	10 P. M.
	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	°	°	°	°	°	°	°
1	30,116	—	—		—	—	—	71,0	—	—	—	—	—	—
2	,102	30,150	30,120	30,100	30,110	30,114	30,124	72,0	80,8	82,5	82,2	79,0	78,2	77,8
3	,096	,132	,110	,095	,090	,096	,098	72,0	77,0	80,[illegible]	80,0	76,9	74,5	75,0
4	,028	,094	,060	,020	,020	,037	,052	68,2	78,2	81,0	81,0	78,0	76,9	75,0
5	,018	—	,046	,018	,022	,042	,072	72,5	--	80,9	81,7	79,8	78,0	77,9
6	,034	,118	,080	,048	,044	,084	,100	72,0	80,7	81,8	82,3	79,2	78,9	79,[illegible]
7	,060	,144	,120	,064	,062	,090	,108	74,3	80,0	80,6	80,0	78,8	77,2	78,[illegible]
8	,050	,114	,086	,046	,034	—	,076	74,2	80,8	81,7	82,0	79,3		78,[illegible]
9	,040	,102	,076	,088	,040	,048	—	74,2	78,0	80,3	79,0	74,6	72,8	
10	,050	,150	,122	,060	,042	,062	,082	72,5	77,7	79,3	79,0	76,0	73,7	70,0
11	,038	,122	,100	,051	,040		,094	68,0	77,9	79,0	79,7	76,0		73,0
12	,052	,132	,100	—	,030	,050	,102	69,6	76,8	78,5	---	76,3	74,8	72,9
13	,056	,142	—	—	,046	,070	,068	71,0	78,0	---	---	77,5	77,2	77,1
14	,050	,126	,070	,056	,064	,100	—	76,8	80,6	81,7	82,0	79,5	79,0	---
15	,080	,200	,186	,162	,050	,168	,158	72,3	80,1	81,3	81,0	78,1	77,8	77,0
16	,150	,220	,202	,174	,160	,174	,184	72,0	78,6	80,5	79,5	77,3	76,3	75,8
17	,152	,184	,166	,152	,120	,132	,130	71,2	77,0	80,0	80,8	77,1	73,2	71,8
18	,108	,160	,142	,114	,112	,126	,128	69,0	78,8	80,4	80,9	78,3	74,1	72,0
19	,128	—	,142	,116	,124	,134	,148	71,1	---	80,5	81,0	78,2	74,9	73,7
20	,118	,156	,134	,114	,118	,028	,132	71,9	a7,5	80,6	81,8	79,0	77,0	75,0
21	,124	,186	,138	,076	,070	,104	,118	69,6	78,0	80,0	81,4	78,0	76,8	73,3
22	,080	,162	,130	,074	,076	,110	,130	69,9	77,8	80,0	80,5	78,0	76,7	75,5
23	,086	,152	,110	,056	,030	,058	,088	71,0	77,5	79,0	79,9	77,7	74,8	72,5
24	,062	,136	,100	,056	,056	,078	,082	68,5	77,2	80,0	81,0	78,8	76,6	71,0
25	,066	,138	,114	,066	,064	,086	,096	70,0	78,0	79,8	80,7	79,2	77,9	76,1
26	,100	—	,132	,090	,078	,102	,112	71,1	---	81,0	81,5	79,5	78,3	73,1
27	,090	,178	,134	,092	,092	,130	,140	72,2	78,4	80,7	81,0	78,9	76,7	73,8
28	,120	,178	,146	,108	,118	,146	,170	73,8	78,2	81,0	82,0	79,8	78,1	75,3
29	,118	,184	,150	,108	,090	,110	,108	74,3	79,4	82,6	82,0	79,1	78,9	78,3
30	,098	,174	,136	,096	,094	,120	,138	72,8	80,0	82,9	83,4	80,3	79,1	78,8
31	,102	,206	,154	,112	,110	,128	,144	74,2	80,7	82,0	82,0	80,0	78,3	74,[illegible]
Mean	30,083	30,158	30,121	30,084	30,074	30,097	30,115	71,7	78,6	80,7	81,0	78,3	76,6	75,[illegible]

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OBSERVATORY; FOR THE MONTH OF JANUARY 1834.

	Dep. of wet bulb Thermometer.							Rain.		Evaporation.	Wind.	Remarks.
	S. Rise	10 A. M.	Aft. N.	2 P. M.	S. Set.	8 P. M.	10 P. M.	S. R.	S. S.			
	°	°	°	°	°	°	°	Ins.	Ins.	Ins.		Flying clouds.
1	4,7	—	—	—	—	—	—			2,201	NW. NE. E.	Mostly clear.
2	4,0	13,5	16,6	14,9	12,0	11,7	10,0				Do.	Hazy but clear.
3	5,7	7,6	13,7	12,0	10,5	9,2	8,9				W. NW. NE.	Mostly clear.
4	5,1	9,4	14,5	11,6	7,3	5,6	3,7				NW. N. NE.	Do
5	2,6		6,4	9,2	8,8	6,1	6,1				N. NE. E.	Do
6	3,0	7,5	9,2	7,5	7,0	7,0	6,2				NW. E. NE. N.	Fl. clouds & driz. [rain.
7	3,8	5,4	7,2	5,7	7,5	4,4	4,8	,003	,052		Do.	Generally clear.
8	3,3	7,9	8,7	8,9	8,0		8,3			1,840	NW. NE. E.	Mostly cloudy.
9	5,0	7,7	8,4	3,9	4,4	3,0					NW. E. N.	Generally
10	5,6	10,0	12,5	12,9	12,2	10,4	6,2	,007			NW. NE. E.	clear.
11	5,7	10,2	12,7	13,5	10,3		7,4				NW. N. NE. E.	
12	5,4	9,5	11,7		7,8	8,8	6,7				N. NE. E.	Clear flying
13	5,1	8,0	—		8,5	6,9	7,1				NW. N. NE.	clouds.
14	7,4	9,6	10,0	10,7	9,5	9,0					NE. E. NE.	
15	3,4	9,8	9,5	9,2	9,0	8,5	8,0			2,257	NE. E. N.	
16	4,0	8,9	10,5	10,3	9,8	10,3	9,9				N. E. NE.	
17	6,4	10,2	12,2	13,6	10,8	7,2	5,8				S. N. NE. E.	
18	6,5	9,6	10,5	11,2	9,8	7,3	6,0				N. E. NE. S.	
19	5,8		13,5	13,2	11,5	8,4	7,8				NW. NE. E	Clear through-
20	7,4	9,8	13,9	15,8	11,0	9,0	7,7				S. SW. SE. E.	[out.
21	5,9	9,0	12,3	15,5	11,0	10,5	7,3				NW. SW. E. SE.	
22	5,1	11,0	11,2	11,8	10,0	9,7	8,3			2,081	NW. E. SE.	
23	5,8	9,7	11,2	11,2	9,7	7,4	5,7				SW. S. SE.	
24	3,6	9,2	11,0	10,7	8,8		5,5				W. SW. SE. E.	Mostly clear.
25	6,0	8,0	8,7	8,6	8,9	7,9	6,7				W. NE. SE. E.	Do.
26	4,9		9,5	10,3	10,7	9,8	5,1				W. E. NE. SE.	
27	5,3	7,4	9,1	8,9	7,1	6,4	4,8				W. S. NE.	
28	6,3	6,4	7,6	10,6	7,8	6,1	4,7				SW. SE. S. E.	Clear through-
29	5,7	7,4	9,2	8,9	7,1	7,0	6,3			1,930	NW. E. NE.	[out.
30	5,3	7,6	14,6	14,4	8,3	7,3	6,7				W. S. SE. E.	
31	5,7	10,4	11,2	11,1	10,2	9,5	7,0				W. SE. E.	Flying clouds.
Mean	5,1	8,9	10,9	10,9	9,2	7,6	6,7					

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METEOROLOGICAL REGISTER KEPT AT THE MADRAS

	Standard Barometer No. 3 by Gilbert.							Standard Therm. by Troughton						
	Sun Rise.	10 A. M.	App. Noon.	2 P. M.	Sun Set.	8 P. M.	10 P. M.	S. Rise.	10 A. M.	App. Noon.	2 P. M.	S. Set.	8 P. M.	10 P. M.
	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	°	°	°	°	°	°	°
1	30,140	30,210	30,174	30,108	30,108	30,114	30,128	72,3	80,1	81,8	81,8	79,8	77,4	74,1
2	,088	——	,134	,092	,100	,126	,130	73,8	——	81,4	81,8	78,8	77,2	75,5
3	,104	,200	,168	,100	,092	,132	——	75,0	80,4	81,6	81,0	79,5	79,0	——
4	,024	,208	,170	,122	,124	,174	,186	78,0	81,8	82,7	83,5	81,6	79,5	79,7
5	,140	,246	,220	,176	,136	,166	,180	73,8	81,0	82,0	82,2	80,1	79,1	77,0
6	,130	,214	,176	,122	,118	,144	,156	72,5	80,3	81,6	82,3	79,5	78,1	78,2
7	,116	,204	,200	,108	,080	,112	,128	72,1	79,5	81,4	81,9	79,8	78,9	79,0
8	,086	,150	,132	,024	,054	,100	,128	74,0	80,1	81,8	82,8	81,2	78,9	76,4
9	,072	——	,090	,050	,042	,088	,116	72,0	——	81,4	82,0	79,7	78,2	77,0
10	,092	,174	,100	,058	,040	,102	,106	69,0	80,0	81,3	81,8	79,7	78,0	77,2
11	,090	,152	,076	,052	,026	,058	,072	69,8	79,9	81,4	82,4	79,6	78,2	77,8
12	,050	,100	,042	,010	,990	,020	,036	71,8	79,2	81,8	82,0	80,0	78,8	78,0
13	,024	,086	,046	,000	,995	,020	,034	72,2	81,0	82,9	83,0	80,3	80,0	79,6
14	,024	,088	,012	,010	,990	,026	,050	76,3	82,0	84,5	84,5	82,7	81,0	81,0
15	,018	,068	,026	,002	,004	,026	,042	78,0	83,0	85,7	86,0	82,4	81,5	81,2
16	,050	——	,092	,040	,040	,086		79,0	——	84,0	84,4	82,0	81,9	——
17	,106	,182	,136	,080	,060	,136	,148	80,5	83,8	84,4	84,0	81,2	80,5	80,0
18	,072	,160	,104	,056	,014	,062	,064	71,5	81,2	82,1	82,8	79,5	76,5	73,0
19	,040	,112	,066	,008	,024	,038	,054	72,8	79,9	84,2	84,8	81,8	77,1	76,0
20	,024	,076	,046	,016	,018	,036	,050	74,5	81,0	86,4	86,3	82,0	79,0	77,0
21	,032	,104	,038	,036	,024	,044	,066	73,7	81,6	84,2	84,0	80,4	78,3	76,3
22	,050	,128	,104	,064	,044	,058	,080	74,0	82,0	86,0	85,0	82,0	79,9	78,2
23	,038	——	,064	,030	,004	,012	,030	74,5	——	84,7	86,3	82,0	80,0	78,0
24	,010	,066	,038	,014	,000	,026	,036	74 8	81,2	83,5	84,0	81,0	79,9	77,3
25	,032	,114	,076	,042	,028	,083	,084	73,3	82,0	83,0	83,8	81,2	80,3	80,0
26	,092	,164	,118	,060	,075	,116	,138	79,3	83,2	84,0	84,8	82,2	81,3	81,0
27	,094	,172	,116	,064	,044	,066	,172	77,3	83,9	85,1	86,2	82,9	81,9	81,8
28	,040	,096	,054	,016	,016	,036	,050	76,9	84,3	86,0	86,0	82,9	81,9	81,2
Mean	30,063	30,144	30,100	30,056	30,046	30,079	30,095	74,4	81,3	83,2	83,6	80,9	79,4	78,1

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OBSERVATORY; FOR THE MONTH OF FERBUARY 1834.

	Dep. of wet bulb Thermometer.							Rain.		Evaporation.	Wind.	Remarks.
	S. Rise.	10 A. M.	App. N.	2 P. M.	S. Set.	8 P. M.	10 P. M.	S. R.	S. S.			
	°	°	°	°	°	°	°	Ins.	Ins.	Ins.	W. E. & SE.	Mostly clear.
1	6,3	10,2	12,1	11,0	10,4	9,6	6,2				W. E. & NE.	Flying clouds.
2	7,1	——	11,3	10,8	8,8	7,3	6,8				NW. E. SE.	Do. Do.
3	6,0	9,8	10,6	9,8	9,8	8,8	——				E. NE & E.	Do. Do. [clear
4	9,2	11,0	10,8	12,1	12,4	10,5	8,7				NE. & E.	Cloudy; night
5	5,7	10,7	10,9	11,3	10,0	9,1	7,8			2,326	N. NE & E.	Do. Do.
6	4,0	8,7	10,1	10,0	7,6	6,8	7,0					
7	5,1	8,2	9,7	10,2	7,8	7,6	7,1				N. NE. SW.	Clear; flying clouds
8	7,0	7,6	9,0	9,8	9,2	8,0	5,2				NW. SE & E.	
9	4,4	——	9,5	11,0	10,1	8,4	8,0				E. NE.	
10	3,5	10,0	9,8	10,8	9,7	8,2	6,8				E. NE. SE.	Generally clear.
11	4,2	10,7	10,6	11,2	9,6	8,4	8,0				NE. E. SE.	
12	5,8	9,9	11,8	11,1	10,0	9,5	9,0			2,000	NE. E. SW.	
13	4,4	9,0	9,7	11,3	8,3	7,8	6,7				NE. S. SE.	Flying clouds.
14	4,2	8,0	11,4	9,3	7,7	6,5	——				N. S. SW.	Clear.
15	2,5	8,0	9,8	10,0	6,4	5,8	5,3				W. S. SE.	
16	5,0	——	8,3	8,5	8,0	7,6	——				W. SE. E.	Mostly cloudy.
17	7,5	9,9	9,7	9,8	9,2	8,2	7,5				E. NE. SE.	Flying Clouds.
18	4,6	10,4	9,5	10,8	7,5	4,5	1,0				N. SE. E.	
19	0,8	7,9	12,2	11,8	8,6	4,1	3,0			2,326	NW. SW. S.	Generally clear.
20	1,6	7,9	13,4	12,5	8,3	5,7	3,7				W. SE. S.	
21	0,1	8,1	10,6	10,2	6,9	4,7	3,0				W. S. SE.	Clear but hazy.
22	0,3	8,4	12,4	11,7	8,0	6,7	5,2				Do	Clear.
23	1,2	——	11,4	13,1	8,2	6,5	5,0				WS. E. S.	
24	3,6	9,9	12,2	12,0	8,8	7,4	5,5				SW. S. SE.	Flying Clouds.
25	1,1	8,6	——	11,4	8,9	7,8	8,0				W. SE. E.	Do. Do.
26	6,8	10,2	10,0	10,8	7,9	7,2	6,7			2,562	S. SE. E.	Mostly clear.
27	3,3	9,5	9,4	10,6	7,0	6,1	6,1				SW. SE. S.	Do. Do.
28	1,2	8,3	10,0	8,8	5,9	4,6	3,6				SW. SE. S.	Do. Lightn.
Mean	4,2	9,2	10,6	10,8	8,6	7,3	6,0					

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The instruments used in the foregoing observations are placed upon a table 3 feet high in the western verandah of the Honourable Company's Observatary; from the Mean of five Barometrical measures lately made the floor of the verandah appears to be *about* 26 feet above the level of the sea (not 45 as was before erroneously supposed.) The barometrical indication are those read off from the instrument, without any reduction for cappiliary action or temperature; for the former, the correction answering to 0,20 inches diameter or +, 059 inches should be employed—The Madras Observatory is situated at about two miles from the sea in longitude 5 hours 21 minutes 9 seconds east of Greenwich and 13 degrees 4 minutes 9 seconds north latitude.

T. G. TAYLOR,
H. C. Astronomer.

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